BRITISH LEPIDOPTERA

SHOUT
SHARE
IT

1868

THE LIBRARY
OF
THE UNIVERSITY
OF CALIFORNIA
DAVIS

GIFT OF

W. HARRY LANGE

Lodge

2/-

Edmund Lamb
Old Lodge
Salisbury

Jan. 96

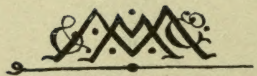
Digitized by the Internet Archive
in 2007 with funding from
Microsoft Corporation

http://www.archive.org/details/handbookofbritis00meyrrich

A HANDBOOK

OF

BRITISH LEPIDOPTERA



A HANDBOOK

OF

BRITISH LEPIDOPTERA

BY

EDWARD MEYRICK, B.A., F.Z.S., F.E.S.

ASSISTANT MASTER AT MARLBOROUGH COLLEGE

London
MACMILLAN AND CO.
AND NEW YORK
1895

All rights reserved

LIBRARY

PREFACE

THIRTY-SIX years have elapsed since the publication of Stainton's *Manual of British Butterflies and Moths,* and no complete work on the same subject has appeared in the interval. Useful as the *Manual* has been, it affords no satisfactory information on structural distinctions except in the *Tineina,* where the author was relying on his own observations; the nearly valueless characters assigned to the other groups being simply copied from other writers, and mainly from the pseudo-scientific work of Guenée. As Darwin's *Origin of Species,* which effected a revolution in the principles of classification, was first published at the end of the same year, it is perhaps not very creditable to British Lepidopterists that so little progress should have been made meanwhile in this direction.

This work is designed to enable any student of British *Lepidoptera* to identify his specimens with accuracy, and also to acquire such general knowledge of their structure and affinities as ought to be possessed by every worker before proceeding to more special investigations. I hope however that, as an elementary guide to the classification of the *Lepidoptera,* it may also prove serviceable to those valued correspondents in many lands who have given me so much assistance in other entomological labours.

The structural characters are in every instance drawn up from my own observations. The system of classification, though now fully published for the first time, is not based on the British species only, but is the outcome of my study of the *Lepidoptera* of the whole world. The specific descriptions are usually made from British examples, but in cases where a species is rare in Britain and there is no reason to suppose that the British form differs from the Continental, I have not hesitated to avail myself of good series of the latter. Larval descriptions require to be made from living specimens, and it would have been impossible to hope to see most of the species within a limited time; I have therefore drawn up these to the best of my judgment from a comparison of the most trustworthy published descriptions, though they are often amazingly contradictory.

On disputed points I have simply stated my conclusions, based on the best available evidence, but without discussion. Published localities or statements which are discredited are omitted without comment; such omissions may be assumed to be intentional. The general exposition of principles in the Introduction must be accepted in place of the explanation of particular instances.

I desire to gratefully acknowledge the assistance rendered by Miss M. Kimber, F.E.S., in collecting and tabulating for me a vast number of records of geographical distribution obtained from the various entomological periodicals and published local lists, as well as others furnished to her by reliable private correspondents.

E. MEYRICK.

5th August 1895.

ERRATA

Page 171, "gonostigma, *L.*" should be "gonostigma, *F.*"
Pages 280, 281, "dolobraria" should be "dolabraria."

INTRODUCTION

The object of the explanations given in this portion of the present work is solely to make the subsequent portion intelligible, and no subject is discussed in greater detail than is necessary for that purpose. Hence no account is given of the internal organs belonging to the digestive, nervous, and muscular systems, which, so far as studied, have not yet been found to present characters available for use in classification.

The *Lepidoptera* are amongst those insects in which the life of the organism, after leaving the egg, is marked by a series of well-defined changes in structure and habits. In the case of the *Lepidoptera* three separate stages (besides the egg) are constituted, each with its appropriate function; (1) the larva (or caterpillar), whose function is growth; (2) the pupa (or chrysalis), whose function is maturation; and (3) the imago (or perfect insect), whose function is reproduction.

Structure of Imago.

All the details of structure hereafter mentioned can be observed with a simple lens of moderate power; but a strong lens (such as a platyscopic or Coddington) will sometimes be found useful. In the examination of obscure details the proper management of the light is essential; if the illumination of the object is satisfactory, the magnifying power of the lens is a secondary consideration.

A Lepidopterous insect is regarded as normally composed of thirteen segments, of which one (really consisting of several segments fused together) forms the head, three the thorax, and the remaining nine the abdomen, though one or two terminal segments of the abdomen are often much modified and little recognisable; four wings and six legs are usually present as paired appendages of the thorax, but in certain cases are not developed.

B

The front part of the head is called the *face*, the upper part the *crown;* sometimes there is a distinct raised transverse *fillet* between the antennae; the sides are mainly occupied by the large *eyes*, and the lower part by the mouth-organs; the back, forming the junction with the thorax, is covered by a *collar* of scales. The organs attached to the head are all paired; these are the eyes, ocelli, antennae, maxillae (combined to form the proboscis), mandibles, maxillary palpi, and labial palpi. Occasionally the chitinous substance of the head is enlarged to form a protuberance, which is of the nature of an excrescence and not a true organ.

The *eyes* are compound, being made up of a very large number of simple lenses, the whole having a more or less hemispherical surface, which is sometimes furnished with erect hairs, but usually glabrous.

The *ocelli* are small simple lenses, placed on the crown close behind the eyes; they are rarely conspicuous, often partially or quite hidden in scales, or entirely absent; their function is not understood, but as they are so frequently obsolete, they can hardly be of much importance. They are often erroneously stated to be absent when only concealed; and in general not much stress should be laid on them for purposes of classification.

The *antennae* are sense-organs, composed of an indefinite number of joints, inserted above the eyes; they vary much in length and structure. Often they are *pectinated; i.e.* the upper angle of each joint is developed into a slender chitinous process like the tooth of a comb; if there are two rows of such processes, the antenna is *bipectinated*, if one, *unipectinated.* If not pectinated, they may be dentate, serrate, or filiform. Very frequently they are *ciliated; i.e.* furnished with one or two series of usually short fine hairs, closely and evenly arranged; when the hairs are collected into fascicles or bundles, which usually happens when they are longer, the antennae are said to be *fasciculate-ciliated.* Occasionally they are *pubescent; i.e.* clothed all over their surface with a short fine down. Sometimes they are furnished with special structures, such as thickenings, notches, sinuations, or tufts of scales. The nature of the sense located in the antennae is not known; but very generally the antennae of the male show an increase of development as compared with those of the female, and there can be little doubt that one of their functions is to enable the former to find the latter.

The *proboscis*, or *tongue*, is an extensible tubular organ, fitted for sucking up the nectar of flowers, and usually spirally coiled when not in use; it is composed of the *maxillae*, which are semitubular and closely appressed together at the edges, but separable at the will of the insect; this arrangement enables the apparatus to be cleansed internally. Although it is usually the only means of taking food, it is in some species absent or so rudimentary as to be useless.

The *mandibles* are biting jaws, working against one another sideways; they have only been observed in a functionally active condition in *Eriocephala*, being apparently aborted or rudimentary in all other imagos, though necessarily well developed in the larvae.

The *maxillary palpi* are jointed organs rising from the base of the maxillae; when fully developed they are six-jointed and usually more or less folded on themselves, but in the large majority of species they are reduced to mere rudiments, their functions being probably assumed by the labial palpi. In certain groups they occur in an intermediate three-jointed stage, somewhat resembling the labial palpi, but on a much smaller scale.

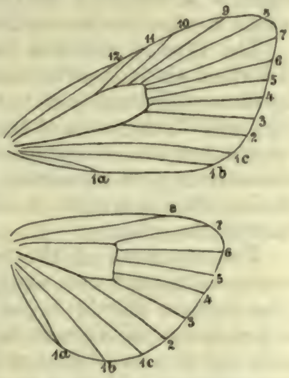
The *labial palpi* are normally three-jointed organs, rising from the *labium* or lower lip, and projecting outside the maxillary palpi. The basal joint is generally small and inconspicuous, but the other two in some groups vary greatly in size, form, and scaling. They may be straight or curved; drooping, porrected, or ascending; smooth, rough, or tufted; obtuse or pointed. The palpi are usually regarded as organs of touch, but no explanation of their variety of form has been suggested; they are independently movable, but in the case of the *Lepidoptera* it does not seem that their use is really understood.

The *thorax* varies little except in scaling, and the presence or absence of dorsal crests. Covering the shoulders are two chitinous scaled flaps, termed the *patagia*.

The *abdomen* is sometimes also furnished with dorsal crests. At its base are two lateral cavities, more or less developed, which appear to be the organs of some sense. The abdomen terminates in a tuft of scales covering the orifice, the *anal tuft*. Within the orifice are concealed the genital organs, which are capable of protrusion; and also the *ovipositor* of the female, though this is in many cases permanently exposed. The genital organs of the male differ greatly in different species, and can often be used as a reliable point of distinction between closely-allied species; but they do not seem in general to afford trustworthy characters for wider classification, and are as yet insufficiently studied. Those most readily discernible are two lateral clasping organs, termed the *prensors*, and a curved upper process, termed the *uncus;* these are variously shaped, and often furnished with spines or hooks; they are often accompanied by an expansible tuft of fine hairs, known as the *genital tuft*, which is a scent-producing organ.

The legs are made up of coxa, femur, tibia, and tarsus. The *coxa*, or basal joint, is short and varies little. The *femur* (plural *femora*) is sometimes hairy, or furnished with tufts. The anterior *tibia* is usually comparatively short, and furnished beneath with a median spine-like process, sometimes also with an apical hook; the middle tibia is normally provided with a terminal pair of spurs, and the posterior tibia with median and terminal pairs of spurs; frequently the posterior tibia (more rarely the middle one) is furnished in the male with an expansible pencil of hairs contained in a longitudinal groove, serving as a scent-producing organ; all the tibiae may be spinose or hairy. The *tarsus* is composed of five joints (the basal being longest), and terminates in two claws; it is often more or less spinose; occasionally it may be partly or wholly aborted, when the leg is modified for other purposes than walking.

The *wings* were perhaps originally tracheal gills, respiratory organs afterwards modified for purposes of locomotion. In form they vary from triangular to almost linear, but the triangular shape may be taken as typical. The junction of the wing with the thorax is the *base;* of the two other angles the upper is the *apex*, the lower the *tornus;* of the three sides the upper is the *costa*, the lower the *dorsum*, and the outer the *termen*. The termen and dorsum are edged with a fringe of short hairs, the *cilia;* when, however, the wings are very narrow, as in many of the *Tineina*, these cilia are greatly developed in compensation, being sometimes six times as broad as the wing itself. Generally from or near the base of the costa of the hindwing rises a stiff bristle or group of bristly hairs, termed the *frenulum*, of which the apex passes under a chitinous catch on the lower surface of the forewing, termed the *retinaculum*, thus serving to lock the wings together; the frenulum is commonly single and strong in the male, multiple and weak in the female; the retinaculum in the female is commonly represented by a group of stiff scales. When there is no frenulum, the costal area of the hindwing is generally dilated basally, so as to rest more firmly against the forewing, and avoid dislocation. But in the *Micropterygina* (as recently discovered by Professor Comstock) a different system prevails; a membranous or spine-like process called the *jugum* rises from the dorsum of the forewing near the base, and passes underneath the hindwing, which is thus held between the process and the overlapping portion of the forewing.



Assumed type of neuration of the *Lepidoptera*.

The wings are traversed by a system of *veins*, tubular structures which serve at once as extensions of the tracheal system, and to form a stiff framework for the support of the wing. In the normal type of *Lepidoptera* the forewings possess three free veins towards the dorsum, termed 1a, 1b, and 1c; a central cell out of which rise ten veins, numbered 2 to 11, the sides of the cell being known as the upper median, lower median, and transverse veins respectively; and a free subcostal vein, numbered 12: whilst the hindwings differ from the forewings in having only six veins rising from the central cell, numbered 2 to 7, so that the free subcostal vein is numbered 8. In some forms a forked parting-vein traverses the middle of the cell longitudinally, and a second parting-vein traverses the upper portion, so as to form a secondary cell; but these are more frequently absent or represented only by folds in the membrane. In a few forms there is a tendency to the production of several false veins, termed *pseudoneuria*, appearing as short branches from the subcostal vein of the hindwings to the costa; these are thickenings of the membrane, and are commonly very irregular and variable, often uneven in thickness or incomplete. Sometimes one of these near the base is better developed and more permanent in character; it is then termed the *praecostal spur*. Modifications in the general arrangement of the veins may arise through any of the following processes, viz.: (1) *obsolescence*, when a vein loses its normal tubular structure, becoming attenuated and reduced in substance, until it appears a mere fold of the membrane; (2) *stalking*, when two veins are fused together for a portion of their length from their base, so as to appear to rise on a common stalk; (3) *coincidence*, when two veins are fused together for the whole of their length, so that one appears entirely absent, an extreme form of stalking; (4) *anastomosis*, when two veins rise separate, meet and are fused together for a certain distance, and then separate again; (5) *concurrence*, when a vein rises separate, runs into another, and does not separate again, an extreme form of anastomosis; (6) *connection*, when two veins are connected by a short transverse bar passing from one to the other, a special form of anastomosis, evolved from the ordinary form under the influence of a tendency to lateral extension. Vein 1b in both wings is often furcate at the base.

The type of veins in the *Micropterygina* differs from that described above in two essential particulars, viz. (1) there may be three additional veins in the forewings, rising out of vein 11 or 12; and (2) the veins of the hindwings are practically identical in number and structure with those of the forewings, being thus much more numerous than in the ordinary type. There is also often a system of cross-bars between the veins near the base of the wing.

The structure of the veins can be best observed on the under-surface of the wing, where they are more prominent. The student should begin by completely denuding of scales a few wings of common species; the wing should be cut off and laid on a moistened piece of glass, to which it will adhere; the scales should then be removed, first from one surface and then from the other, with a fine moist camel's-hair brush, an operation requiring a little patience and delicacy of touch; the veins will thus be rendered conspicuous. When, however, the student has familiarised himself with the general subject, it will not be found necessary in practice to resort to this process; most details will be easily observed without denudation; where this is not the case (as where the veins are closely crowded or otherwise obscured), the scales can be removed with the brush on the under-surface in the locality of the difficulty only, without cutting off the wing or otherwise damaging the specimen, which remains in the collection available for all purposes as before; with proper practice, even the smallest species are amenable to this treatment, which does not require more skill than the actual setting of the specimen. Some workers prefer to put a drop of benzine on the spot, which renders it temporarily transparent; the effect is short-lived, as the benzine evaporates rapidly, and the cilia (if long) are liable to be damaged by this method.

Pupa.

The pupa is wholly encased in a chitinous integument, rendering the ordinary organs of locomotion useless; but some pupae, which are subterranean or inhabit the hollow stems of plants, are capable of working themselves along by means of rings of spines on the margins of the abdominal segments. In the more ancestral forms of the *Lepidoptera* the chitinous envelopes of the antennae, legs, and other organs are more or less free and detached from the general integument, though incapable of movement; whilst in the more advanced forms the cases of these organs are fused with the general integument. The only recorded instance of active organs in a Lepidopterous pupa is that of *Micropteryx*, in which the large mandibles and labial palpi are functionally active. The segments of the abdomen may be either free (movable at their base) or fixed, the number of free segments differing in different groups and genera; in the earliest forms the segments are all free, but the number of free segments tends continually to diminish; in certain *Papilionina* and *Tineina* all are fixed.

Usually the pupa is enclosed in some sort of cocoon, but this protection is sometimes dispensed with. In most cases it is concealed beneath the surface of the ground or amongst leaves and refuse; in the case of mining species it is often within the mine; less frequently it is entirely exposed, attached by the tail and sometimes by a median silken girdle, and is then usually protectively coloured.

When dehiscence (the breaking-up of the pupal integument to allow of the escape of the imago) takes place, in the earlier forms the cases of the various organs remain intact, the organs being simply withdrawn from them; whilst in the more advanced forms the inner wall of these cases, being extremely slight, is practically destroyed, and the general integument is broken up irregularly.

Larva.

In the larva the thirteen segments are usually clearly defined; they are referred to hereinafter by their numbers, 1-13, 1 being the head. This is furnished with simple eyes and strongly-developed mandibles; antennae are usually rudimentary, but in *Eriocephala* developed. Usually there is a spinneret beneath the mouth, from which a fine silk is produced. Segments 2-4 bear each a pair of true jointed legs, corresponding to those of the imago, seldom absent. In addition to these there are also in the normal type of Lepidopterous larva ten prolegs, sucker-like extensions, whose extremities are furnished with series of minute hooks, situated in pairs on segments 7-10 and 13, but some or all of these may be rudimentary or absent. In the archaic *Eriocephala* there are prolegs on 5-12; and in one or two other instances there are rudimentary paired ventral processes on other segments than those on which prolegs normally appear, but so little developed that it can hardly be determined whether they are really homologous with the true prolegs or not. The surface of the body is furnished with numerous dots, spots, or tubercles (variously styled according to their character, which varies much in different species), of which some at least usually bear each a fine hair, or sometimes dense fascicles of hairs; sometimes these tubercles are developed into spinous processes, branched with hairs. The *spiracles*, or orifices of the respiratory tubes, are placed in a row along the sides of the body, not far above the legs. The contractile dorsal vessel, which is the main circulatory organ, runs along the middle of the back, and is often visible through the skin.

The whole growth of the insect takes place in the larval stage, the increase of bulk being frequently very rapid. During the process the larva casts its skin several times (usually from four to six), sometimes undergoing considerable changes of appearance and habit on these occasions.

The markings of larvae usually take the form of longitudinal lines; of these the one which runs up the middle of the back is termed the dorsal, that which includes the spiracles the spiracular line; those which margin the spiracular are the supraspiracular and subspiracular respectively; between the dorsal and spiracular are placed two others, the upper being the subdorsal, the lower the lateral. These are seldom all present; the dorsal and spiracular alone rest on a structural basis, the others being assumed by a useful convention.

Ovum.

The ovum, or egg, is small and more or less globular; its surface is frequently sculptured, and assumes special characters in particular groups; the colour usually undergoes marked changes during the development of the embryo.

Variation.

Probably variability is an original characteristic of all organisms; but the laws of inheritance, and the favouring of a particular type by natural selection, have tended to produce constancy. This constancy is, however, often imperfectly realised; that is to say, all insects show more or less variation in some particulars. Thus there is always some variability in size and proportions; often also in colour and markings. Variations in structure are less common; in certain groups there is variability in some details of neuration. Allied species may be expected to vary in the same way, but otherwise experience is the only guide, the same characters which are absolutely constant in one group being often highly variable in another.

Varieties may be broadly classified as being of two kinds, viz. gradual and sudden; the former being connected with the type-form by numerous slight intermediate gradations, the latter not so connected. The former kind represent the outcome of those subjective tendencies to variation which have not been eliminated by the working of natural selection, and may be termed normal; whilst the latter are apparently due to some objective interference with the process of development, and are in that sense abnormal. The line between these two classes is not always easy to draw in practice, but the distinction is real.

Gradual varieties attached to a particular locality or region are called local or geographical forms; those occurring at a particular time of year seasonal forms. Variation caused by the failure of colouring matter is termed albinism; that due to an excessive prevalence of black pigment is melanism; but the application of these terms to varieties which are merely lighter or darker than usual is erroneous. Specimens showing sudden variations in colour or marking are commonly termed aberrations; in structure, monstrosities. The most common examples of monstrosities are produced by multiplication of parts, as when an insect possesses an additional leg or vein; or by gynandromorphism, the term used when an individual of one sex exhibits on one lateral half the organic characters of the other sex, more or less completely.

Principles of Classification.

It is now admitted that the resemblances of allied genera and species are to be explained by community of descent.

Hence a system of classification will be natural or artificial, according as it does or does not keep steadily in view this principle, with which all sound results must be consistent.

When it has been decided that a number of genera possess so much mutual resemblance in structure that they may be regarded with probability as constituting a distinct branch of the genealogical tree of the *Lepidoptera* (and this is what is meant by family grouping), the question must arise, which of these genera are older than the others, and which are the latest developments. It may often be difficult and sometimes impossible to answer this, but in most cases an approximate result can be reached by a consideration of the following laws, viz.:—

(1) No new organ can be produced except as a modification of some previously existing structure.

(2) A lost organ cannot be regained.

(3) A rudimentary organ is rarely redeveloped.

To the first of these laws certain monstrosities offer an apparent (though not real) exception, but as there is no evidence to show that such monstrosities are ever reproduced under natural circumstances, they may be omitted from calculation.

Certain other considerations may likewise be of assistance. A large genus, especially if also of very wide distribution, cannot be a very recent one, since it must have required a long period for the differentiation of numerous species, though it must be remembered that as the genus grows larger, the process may become more rapid, from the increased basis of production. On the other hand, a small genus may be of any age; but one which is closely related to a large genus will almost always be later than it, and a small genus which is widely distributed must generally be an old one.

In applying the above-mentioned laws in practice, it must be constantly borne in mind that, because two genera are now more closely allied together than to any other, it does not follow that either is descended from the other; it is very frequently the case that both are equally derived from a third genus now no longer existent; in such a case they are said to be correlated. Further, when one genus is said to be derived from another, and the earlier genus is rich in species, it is not usually meant that the later genus springs from the more advanced forms of the earlier one, but much more commonly from a species standing very near the bottom of the list.

In determining the relative value to be assigned to different characters for the purposes of classification, those characters which are adaptive, *i.e.* liable to be affected by external agencies through the means of natural selection, are generally very untrustworthy. Conversely, a character which seems of little physiological importance, and not easily modified by ordinary external influences, is commonly of especial value. Thus colour and outline, the hairs of larvae, and the genital organs of imagos are likely to be of slight importance in the definition of groups; whilst neuration occupies a high position, except when directly influenced by an alteration in form of wing, which is seldom the case. A combination of several characters which are apparently not interdependent carries very great weight.

It is sometimes said that genera (and families) are artificial creations. If by this is intended that they consist of a certain number of species having no other relation than the common possession of certain characters, the statement is not true of any sound system, and the systematist who makes it stands self-condemned; but if it is only taken to mean that the precise limits of genera may often be differently conceived by different workers, it is to that extent quite true. If two small allied groups of species agree in all essential characters, and are capable of definition as a whole which can be distinguished from all other groups, yet are also constantly separable from one another by a single and perhaps slight character, the question whether they are to be reckoned as two genera or as sub-groups of a single genus must always remain one which may be answered differently by different workers. The same is true of families; and a consideration of the nature of a genealogical tree and the diversity in the length of its branches will show that it is unreasonable to expect all individual groups of any particular denomination to be of the same actual value.

Some writers have urged that secondary sexual characters should never be used to define genera. No doubt there is a convenience in only using such characters as are common to both sexes, since the student who is trying to identify the insect may only possess examples of one sex; but there is absolutely no scientific justification for the restriction, which would make the classification of some groups of *Lepidoptera* quite impracticable; when such structural characters are found in any instance to assist the definition of natural genera, there is no reason in nature why they should not be employed with perfect freedom.

Phylogeny.

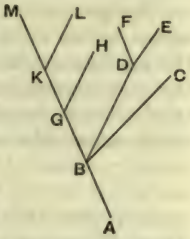
This term is used to express the scheme of descent of a group. From a consideration of the laws enunciated above, there can be no doubt that the *Micropterygina* are the ancestral group of the *Lepidoptera*, from which all others have descended; this is sufficiently proved by the existence of the four or more additional veins in the hindwings of that group, for these veins, if not originally present, could not have been afterwards produced. Of the two families of that group, the *Micropterygidae*, which possess an additional vein (or veins) in the forewings, and fully-developed six-jointed maxillary palpi, must be more primitive than the *Hepialidae.* Now if the neuration of the whole of the *Lepidoptera* is compared with that of all other insects, it will be found that in no instance is there any close resemblance, except in the case of the *Micropterygidae;* but the neuration of these so closely approaches that of certain *Trichoptera* (caddis-flies) as to be practically identical. The conclusion is clear, that the *Lepidoptera* are descended from the *Trichoptera*, and that the *Micropterygidae* are the true connecting link. If the other marked structural characters of the *Micropterygidae* are taken into consideration, viz., the possession of the jugum, the large development of the maxillary palpi as compared with the labial, and the sometimes functionally active mandibles, they will be all found commonly in the *Trichoptera*, affording additional confirmation. It may be added that in one exotic (New Zealand) species of *Micropterygidae*, vein 1b is basally trifurcate, a character frequent in the *Trichoptera*, but not yet discovered in any other Lepidopteron. In most *Trichoptera* the veins of the hindwings are much more numerous than those of the forewings, in the *Micropterygina* they are usually equal in number, in other *Lepidoptera* they are less numerous; in the course of descent there has therefore been a greater progressive diminution in the number of veins of the hindwings as compared with those of the forewings, though these have also diminished.

It is unnecessary for the purposes of this book to trace back the descent of the *Lepidoptera* further; but it may be worth while to point out that we may assume as the primitive type of Trichopterous neuration, a system of numerous longitudinal veins gradually diverging from the base, mostly furcate terminally, and connected by a series of irregularly placed crossbars near base, and another series beyond middle.

Method of Arrangement.

The natural order of arrangement, which is that of a much-branched tree, cannot be adequately expressed by a simple linear succession, such as is alone practicable in a book. It is however possible to devise a linear succession which shall be consistent with the natural genealogical order, if some additional explanation can be given. The method here adopted is as follows.

Suppose the accompanying diagram represents a portion of the genealogical tree; then the order will begin at M and descend to K, recommence at L and descend to K, and thence to G, recommence at H and descend to G and thence to B, recommence at F and descend to D, recommence at E and descend to D and thence to B, recommence at C and descend to B and thence to A, and so on. Thus the order begins with the most recently developed forms and descends gradually to the earliest or most ancestral, which are the last in the book. To understand the order in practice, it may be assumed that each genus is descended from that which immediately follows it in the book, unless its actual descent is expressly stated otherwise; such statement will of course require to be made before every recommencement of a fresh branch. This system has been adhered to throughout, and after a little use will not be found unintelligible. If adopted in the arrangement of a collection in the cabinet, it would be a good plan to indicate the recommencement of a fresh branch by a special mark, such as a red bar drawn above the first (or highest) species.



In the arrangement of species within each genus the same plan has been followed; but since a more intimate study of very minute points than has been here possible would be required to ascertain accurately the mutual affinities of forms which are often very closely related together, it has not been thought necessary to enter into any very precise explanation of their order.

Nomenclature.

The full name of each insect consists of two parts, the generic and specific, taken together, *e.g. Vanessa urticae;* and it is a mistake to employ the specific name by itself. Frequently the same species has received different names from different authors; in such a case the earliest name is adopted, unless preoccupied by another species in the same genus, and the other names are called synonyms. In this book synonyms are given in brackets after the adopted name; but only such synonyms are quoted as have been employed in English works still in common use, and it has not been thought worth while to notice the variations of termination introduced by Doubleday. Following the specific name is given (in abbreviated form) the name of the author who first bestowed it; this, though not necessary, is often convenient, as the same name has been not unfrequently used by different authors to apply to different insects.

The genera are associated together to form families, all of whose titles have the termination *-idae* or *-adae*. Similarly the families are associated together in groups, whose titles have the termination *-ina*. Occasionally it is found convenient to subdivide a family into sub-families, whose titles have the termination *-ides* or *-ades*.

Method of Description.

A species will be most quickly identified by means of the complete system of analytical keys supplied; following the definition of the order will be found a key to the groups, under each group a key to the families contained in it, under each family a key to the genera, and under each genus a key to the species; these four stages include the whole process. Every key is dichotomous throughout, that is, each head is subdivided into two until the final results are reached. Each head is numbered consecutively, and each subdivision of a head is made to refer either to a final result or to a following head. Thus, in the tabulation of groups, under the first head, we have to decide whether the species under examination has more than six veins rising from the cell of the hindwings; if it has, it is at once referred to the *Micropterygina*, to which we should turn for the next tabulation; if not, it is referred to the number 2, meaning the second head, of which the subdivision proceeds in the same way. Care has been taken to make these tabulations as accurate as possible, but they are necessarily based in general on single characters, and should be regarded as affording probable indications only, the full description being always consulted for complete verification.

The descriptions of groups, families, genera, and species, are framed with a view to conciseness, and do not claim to be complete, but no character of recognised importance is omitted. If in the description of a family a character is attributed to the family as a whole, this character is not afterwards repeated in the descriptions of the genera; similarly, characters assigned to the groups are not repeated in the families. The characters given are supposed to be absolute for the British fauna, but exceptions occur in exotic forms, which it has not been thought necessary to mention.

In structural descriptions, proportional measurements are sometimes briefly expressed in numbers as follows: ciliations of the antennae are measured in terms of the breadth of the stalk, thus "ciliations ½" means "ciliations half as long as the antennal stalk is broad"; the length of the antennae is expressed in terms of the length of the forewings, thus "antennae over 1" means "antennae longer than forewings"; the length of the palpi is expressed in terms of the breadth of the eye, thus "palpi 2½" means "palpi two and a half times as long as the eye is broad"; the length of the tarsus is expressed in terms of the length of the tibia, thus "tarsus 1½" means "tarsus half as long again as the tibia"; the outer spurs of the tibiae are expressed in terms of the inner, thus "outer spurs ¾" means "outer spurs ¾ of the length of the inner"; the breadth of the hindwings is expressed in terms of the forewings, thus "hindwings 1" means "hindwings as broad as forewings"; the length of the cilia of the hindwings is expressed in terms of the breadth of the hindwings, thus "cilia 6" means "cilia six times as long as the hindwings are broad." In describing the veins, they are assumed to be all present and separate, except so far as they are expressly mentioned to be otherwise. Generally, the absence of peculiar characters is assumed unless they are mentioned as present.

In specific descriptions, the expanse of the wings (measured on specimens set in the usual way) is given in millimetres (25 millimetres practically = 1 inch). The head and thorax may generally be assumed to be coloured like the forewings, unless particularly mentioned. The markings of the forewings are described in accordance with a certain assumed type; the type of markings varies in different groups, but is explained under the head of each group. Typical markings not mentioned may be assumed to be absent. All colours are described as seen under a lens of moderate power, which destroys optical illusions.

Under each genus is given its geographical distribution, so far as authenticated, but often the available information is very incomplete, the *Lepidoptera* of many regions being as yet very inadequately known. The geographical distribution of each species within the British Isles is reckoned (unless otherwise expressed) from the south northwards, and from the east westwards, and stated in counties except in the case of Ireland, which (being still very inadequately explored) is merely quartered into north, south, east, and west; England is taken to include Wales, Britain to include England, Wales, and Scotland; limits are inclusive; thus "England to York" means "the whole of England and Wales from the south as far as and including Yorkshire;" "Kent to Dorset and Norfolk" means the whole triangle of which these three counties form the angles. The Clyde is taken to mean the latitude of the Firth of Clyde. The geographical distribution outside the British Isles is reckoned from the west eastwards, and from the north southwards; it is no doubt often incompletely known, especially in the smaller species. A species is said to be common within its range if it is found wherever its food is plentiful; local, if it is restricted, within the limits of its range, by other conditions than those connected with the supply of food. Thus an oak-feeding species is common if it occurs wherever oaks grow freely inside its territory, local, if it occurs in some oak woods and not in others. All species may be expected to be less plentiful towards the outskirts of their range.

Following the geographical distribution are numbers indicating the months (1 to 12) in which the imago is ordinarily to be found; thus 6 is June, 10 is October. These dates must be taken to refer to an average district of low elevation in England, and an ordinary season; great allowance must be made for variation due to differences of situation, latitude, elevation, and weather; these differences may influence the date by as much as a month or six weeks in either direction. The dates for the duration of the larval stage are indicated in the same way. Some species have normally two generations in the year, and these are noted, but many others are liable to have a second generation in warm localities and favourable seasons; of these irregular and variable appearances no account is taken.

The larval descriptions are intended to refer to the larva in its final stage, but whilst still feeding; after the larva has ceased feeding, a day or two usually elapses before it begins to spin its cocoon, and during that time considerable changes of colour frequently take place, probably mainly due to the cessation in the supply of chlorophyll, since these changes are usually in the direction of the loss of green colouring, but perhaps also sometimes influenced by other physical causes, or by a leaning towards a protective dress. The earlier stages are often also more or less different, but are not described, as they would have required a very considerable amount of additional space; they are moreover less distinctive, less known, and less likely to be met with.

The food-plants are in general recorded under their scientific names only, except in the case of a few of the most familiar and unmistakable trees and shrubs (oak, elm, hawthorn, hazel, etc.); every entomologist ought to have some acquaintance with practical botany, but for the convenience of beginners an appendix is added giving the ordinary English names of those plants which are generally well known. If more than one food-plant is recorded, they are placed, so far as possible, in the usual order of preference, that which is most commonly preferred by the larva being placed first. Some larvae (especially amongst the *Caradrinina*) are remarkably indiscriminate in their choice; in such cases a full list of recorded food-plants would be long and useless; three or four only are given as examples of those generally chosen, followed by an etc., which may usually be taken to include many plants more or less nearly allied to those mentioned.

GLOSSARY

anastomose: to unite for a certain distance and separate again.
antemedian: before the middle.
anterior: nearer to the head.
apodal: without legs.
apterous: without wings.
areole: a secondary cell formed by anastomosis of veins.
bicolorous: of two colours.
bicuspidate: forming two points.
bifid: centrally cleft.
bipectinated: with two series of pectinations.
caudate: with a tail-like projection.
chitine: a horny substance, forming the hard structures of insects.
cilia: fine hairs.
ciliated: with series of cilia.
ciliations: antennal series of cilia.
concolorous: of the same colour.
connate: rising from the same point.
correlated: derived from the same ancestral form.
costa: upper margin of wing.

costal: touching costa.
dehiscence: breaking of the pupal integument in emergence.
dentate: toothed.
dorsal: touching dorsum.
dorsum: lower margin of wing.
emarginate: with the margin abruptly excavated.
exserted: thrust out and exposed.
external: on the side nearest the margin.
fascia: a transverse band.
fascicle: a small group of cilia.
fasciculated: collected in small groups.
ferruginous: rust-coloured.
filiform: thread-like.
fovea: a small round depression.
frenulum: one or more bristles from base of costa of hindwings.
fugitive: soon disappearing.
furcate: two-branched.
fuscous: grey-brown.
fusiform: spindle-shaped.
glabrous: without hairs.
hyaline: without scales and transparent.
infuscated: tinged with fuscous.
internal: on the side furthest from the margin.
interneural: between the veins.
jugum: a membranous process from dorsum of forewings.
labial: attached to the labium.
labium: lower lip.
lamellate: with series of broad flat plate-like projections.
maxillae: a pair of jaws composing the proboscis.
maxillary: attached to the base of the maxillae.
neural: of the veins.
neuration: arrangement of the veins.
ocellus: a small simple eye; also used for an eye-like spot.
ovipositor: organ for laying eggs.
patagia: shoulder-pieces of the thorax.
pecten: a row of projecting hair-scales.
pectinated: with series of pectinations.
pectination: one of a series of slender chitinous processes.
pencil: a long slender tuft of hairs.
penicillate: terminating in a tuft of hairs.
phylogeny: scheme of descent.
polyphagous: feeding indiscriminately on many plants.
porrected: directed straight forwards.
posterior: further from the head.
postmedian: beyond the middle.
postsubterminal: following the subterminal line.
praecostal spur: a false vein in costal angle at base of hindwings.
praesubterminal: preceding the subterminal line.
praetornal: preceding the tornus.
prensor: genital lateral clasping organ.
proboscis: tubular tongue formed by the maxillae.
proleg: ventral hook-bearing process serving as a leg.
pseudoneurium: a false vine, formed by a chitinous thickening.
pubescent: wholly clothed with short down.
quadrifid: cleft into four lobes.
retinaculum: a catch to receive the frenulum.
semiapterous: with aborted wings.
serrate: with saw-like teeth.

serrulate: with small saw-like teeth.

seta: a fine bristle.

shade: a cloudy ill-defined streak.

sinuate: slightly curved inwards.

spiracle: a breathing-aperture.

stalked: rising from a common stalk.

stria: a fine transverse line.

striated: with numerous striae.

striga: a slender streak.

strigula: a short fine transverse mark.

strigulated: with numerous strigulae.

sub-: in composition, denotes nearly or rather.

termen: posterior margin of wing.

tornal: touching tornus.

tornus: the junction of the termen and dorsum.

trachea: a breathing-tube.

trifid: cleft into three lobes.

trifurcate: with three branches.

truncate: with a straight vertical edge.

uncus: a curved upper genital process.

unipectinated: with one series of pectinations.

vein: a branch of the tubular framework of the wing.

whorl: a circular series.

LIST OF ABBREVIATIONS OF AUTHORS' NAMES

B.	Boisduval.
Barr.	Barrett.
Bch.	Bouché.
Bed.	Bedell.
Bgstr.	Bergsträsser.
Bjerk.	Bjerkander.
Bkh.	Borkhausen.
Boh.	Boheman.
Brd.	Bruand.
Brh.	Brahm.
Cap.	Capieux.
Cl.	Clerck.
Clem.	Clemens.
Curt.	Curtis.
Dalm.	Dalman.
Dbld.	Doubleday.
Desv.	Desvignes.
Dgl.	Douglas.
Don.	Donovan.
Dup.	Duponchel.
Esp.	Esper.
Ev.	Eversmann.
F.	Fabricius.
Forst.	Forster.
F. R.	Fischer von Röslerstamm.
Fr.	Frey.
Fröl.	Frölich.
Frr.	Freyer.
Fuesl.	Fuessly.
Geoffr.	Geoffroy.
Germ.	Germar.
Gern.	Gerning.
Gn.	Guenée.
Gregs.	Gregson.
Gz.	Göze.
Hatch.	Hatchett.
Hb.	Hübner.
Hein.	Heinemann.
Heyd.	Heyden.
H.-G.	Hübner and Geyer.

Hoch.	Hochenwarth.
Hodgk.	Hodgkinson.
Hof.	Hofmann.
H.S.	Herrich-Schäffer.
Hufn.	Hufnagel.
Hüm.	Hümmel.
Hw.	Haworth.
Kn.	Knoch.
Koll.	Kollar.
L.	Linné.
Lasp.	Laspeyres.
Latr.	Latreille.
Lch.	Leach.
Ld.	Lederer.
Lef.	Lefebvre.
Lew.	Lewin.
Mab.	Mabille.
McL.	McLachlan.
Meig.	Meigen.
Meyr.	Meyrick.
Mn.	Mann.
Mühl.	Mühlig.
Müll.	Müller.
Newm.	Newman.
Nic.	Nicelli.
Nolck.	Nolcken.
O.	Ochsenheimer.
Ol.	Olivier.
Pall.	Pallas.
Panz.	Panzer.
Pey.	Peyerimhoff.
Pod.	Poda.
Rag.	Ragonot.
Ramb.	Rambur.
Retz.	Retzius.
Rich.	Richardson.
Roem.	Roemer.
Ross.	Rossi.
Rott.	Rottemburg.
Rsl.	Rössler.
Rtz.	Ratzeburg.
Sc.	Scopoli.
Schiff.	Schiffermiller.
Schl.	Schläger.
Schm.	Schmidt.
Schrk.	Schranck.
Sirc.	Sircom.
Sodof.	Sodoffsky.
Spr.	Speyer.
Stgr.	Staudinger.
Stph.	Stephens.
Stt.	Stainton.
Tausch.	Tauscher.
Tgstr.	Tengstrom.
Thnb.	Thunberg.
Tr.	Treitschke.
View.	Vieweg.
Vill.	Villers.
Walk.	Walker.
Wallgr.	Wallengren.
Wernb.	Werneburg.
Westw.	Westwood.
Wilk.	Wilkinson.
Wk.	Wocke.
Wlsm.	Walsingham.
Z.	Zeller.
Zett.	Zetterstedt.
Zk.	Zincken.

ORDER—**Lepidoptera**

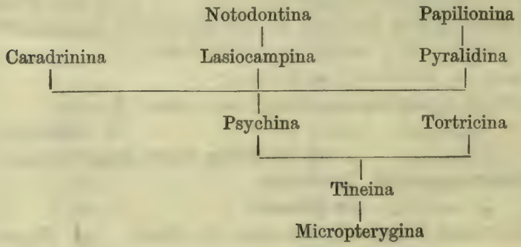
CHARACTERISED by the flat coloured scales clothing the four membranous wings, the peculiar type of neuration, and the tubular tongue-like structure of the maxillae. A very few *Trichoptera* show similar scales, but can be distinguished by neuration and mouth parts. The order is divided into nine main groups, which may be tabulated as follows :—

1. Cell of hindwings emitting more than 6 veins
9. *Micropterygina*.
,, ,, not emitting more than 6 veins 2.
2. Hindwings with 1c absent . . . 3.
,, ,, 1c present . . . 8.
3. Antennae terminally clavate (clubbed) 4. *Papilionina*.
,, not terminally clavate . . . 4.
4. Neuration much degraded . 8. *Tineina* (part).
,, not much degraded . . . 5.
5. Hindwings with 1b rather strongly furcate
7. *Tortricina* (part).
,, ,, 1b indistinctly or not furcate . 6.
6. Forewings with 5 basally approximated to 4 . 7.
,, ,, 5 parallel to 4, or approximated
to 6 . 2. *Notodontina*.
7. Frenulum present ; 8 of hindwings remote from 7
1. *Caradrinina*.
,, absent ; or 8 of hindwings approximated
to 7 beyond cell . 3. *Lasiocampina*.
8. Middle-spurs of posterior tibiae very short or absent
6. *Psychina* (part).
,, (or at least one) well-developed . 9.
9. Wings divided terminally into segments
5. *Pyralidina* (part).
,, not divided into segments . . 10.

10. Hindwings with 8 approximated to cell and anterior half of 7, often anastomosing with 7, never connected with cell . 5. *Pyralidina* (part).
Hindwings with 8 remote from 7, sometimes connected with cell . . . 11.
11. Hindwings with 8 anastomosing with cell 6. *Psychina* (part).
„ „ 8 not anastomosing with cell . 12.
12. Labial palpi obtuse . . 7. *Tortricina* (part).
„ more or less pointed . 8. *Tineina* (part).

The phylogeny, or scheme of development of these groups, is shown in the accompanying diagram :—

Phylogeny of Lepidoptera.



1. CARADRININA.

Maxillary palpi obsolete. Forewings: 1b simple or hardly furcate, 1c absent, 5 approximated to 4 towards base. Hindwings with frenulum, 1c absent, 8 connected or anastomosing with cell.

The four families which constitute this group in Britain are closely related together; the first three represent three separate lines of development, rising nearly simultaneously from a common origin in the *Ocneriadae*, which family is clearly derivable from an early form of the *Psychidae*. The *Syntomididae* (probably not authentically found in Britain) are an advanced development of the *Arctiadae*.

Imago with forewings more or less elongate-triangular, termen not very oblique; hindwings broad-ovate.

Type of markings.—Forewings with five transverse lines, viz.: subbasal (not reaching dorsum), first, median, second, and subterminal, and three discal spots, viz.: a roundish antemedian called the orbicular, a somewhat kidney-shaped postmedian called the reniform, and an elongate spot placed beneath the orbicular and called the claviform. Hindwings with two posterior lines (representing second and subterminal) and a discal spot (representing reniform), but these are generally faint or obsolete.

Larva sometimes very hairy, usually with 10 prolegs, those on 7 and 8 sometimes absent. Pupa with segments 9-11 free; not protruded from cocoon in emergence.

TABULATION OF FAMILIES.

1. Hindwings with 8 connected by bar with cell
4. OCNERIADAE.
,, 8 anastomosing with cell . 2.
2. 8 anastomosing with cell shortly near base only . 3.
,, ,, to near middle or beyond 4.
3. Hindwings with 5 imperfect or obsolete
2. CARADRINIDAE.
,, ,, 5 well developed . 3. PLUSIADAE.
4. Face forming a rounded prominence
2. CARADRINIDAE (Stilbia).
,, not prominent . . . 1. ARCTIADAE

[Two species of the *Syntomididae*, an extensive tropical family distinguished from all the four mentioned by the absence of vein 8 of the hindwings, which is wholly coincident with the cell and 7, are said to have occurred in England, viz.: *Syntomis phegea*, L., a black white-spotted species, in Kent, and *Naclia ancilla*, L., a small brownish sometimes white-spotted insect with orange hindwings, in Sussex; but these records are extremely dubious].

1. ARCTIADAE.

Eyes glabrous. Tongue developed. Posterior tibiae with all spurs present. Hindwings: 6 and 7 connate or stalked (rarely approximated or coincident), 8 anastomosing with cell nearly or quite from base to near middle or beyond.

Although fairly represented in nearly all regions, this family attains increased development within the tropics. The typical wing-markings are not often distinctly traceable, tending to be replaced by irregular spots and blotches, or altogether lost. There is a considerable range of variation in structure, as well as in superficial appearance, but the different forms are linked together in such a way that subdivision into definite groups is not practicable. The phylogeny is difficult, but *Callimorpha* is clearly the most ancestral form (in this and other exotic genera which approach nearest to the two next families, the strong bar-like retinaculum offers an additional point of distinction), and the group of *Tyria* and *Arctia* is closely derived from this; the *Lithosia* group may probably be a development of the *Arctia* group; whilst the *Nola* group and that of *Sarrothripus* and *Halias* appear to be two ancient and now fragmentary sections, to some extent intermediate in character between the two mentioned above, but sufficiently isolated to make their origin at present undecipherable.

Ovum in groups of *Arctia* and *Lithosia* usually spherical, smooth or minutely pitted; in *Nola* group strongly ribbed. Larva usually hairy, except in *Halias* group; in *Nola* group without prolegs on 7. Pupa usually in a cocoon above ground.

Tabulation of Genera.

1.	Forewings with 7 separate	2.
	,, ,, 7 out of 9, or absent	4.
2.	Hindwings with 5 absent	11. SARROTHRIPUS.
	,, ,, 5 present	3.
3.	Head rough-haired	14. HALIAS.
	,, smooth-scaled	13. HYLOPHILA.
4.	Hindwings with 4 or 5 absent	5.
	,, ,, 3, 4, 5 all present	10.
5.	Forewings with 5 absent	2. LITHOSIA.
	,, ,, 5 present	6.
6.	Forewings with 7 or 8 absent	8.
	,, ,, veins all present	7.
7.	Forewings with 10 connected with 9	1. OEONISTIS.
	,, ,, 10 separate	12. EARIAS.
8.	Forewings with 10 absent	8. ROESELIA.
	,, ,, 10 present	9.
9.	Hindwings with 4 absent, 3 and 5 parallel	9. NOLA.
	,, ,, 5 absent, 3 and 4 connate	17. COSCINIA.
10.	Forewings with 7 absent	7. NUDARIA.
	,, ,, all veins present	11.
11.	Antennae in ♂ bipectinated	12.
	,, ,, ciliated	14.
12.	Forewings with 10 out of 9	13.
	,, ,, 10 rising separate	20. ARCTIA.

13. Forewings with scale-tufts on surface . 10. Uraba.
„ without scale-tufts . . 19. Diacrisia.
14. Forewings with 10 out of 9 . . . 15.
„ „ 10 rising separate . . 16.
15. Head rough-haired . . 18. Phragmatobia.
„ with loosely appressed hairs . 15. Tyria.
16. Hindwings with 4 and 5 stalked . . . 17.
„ „ 4 and 5 separate . . 19.
17. Forewings with 11 anastomosing with 12 . 18.
„ „ 11 not anastomosing with 12 3. Gnophria.
18. Thorax beneath and abdomen hairy . 4. Cybosia.
„ „ „ smooth-scaled 5. Setina.
19. Hindwings with 8 rising from near end of cell 6. Miltochrista.
„ „ rising from or before middle of cell 20.
20. Thorax hairy beneath . . 21. Callimorpha.
„ smooth beneath . . 16. Utetheisa.

1. Oeonistis, *Hb.*

Head smooth. Ocelli absent. Antennae in ♂ ciliated, with longer setae at joints. Palpi moderate, ascending, loosely scaled. Thorax hairy beneath. Abdomen hairy. Tibiae smooth-scaled. Forewings: 2 and 3 sometimes short-stalked, 7 and 8 out of 9, 10 connected with 9. Hindwings: 3 and 4 short-stalked, 5 absent, 6 and 7 in ♂ coincident, in ♀ stalked, 8 from middle of cell.

Only one species is really established. Imago with forewings very elongate. Larva with tufts of rather long hairs.

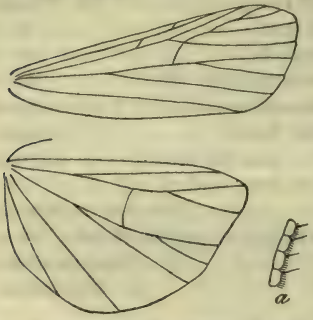
1. **O. quadra**, *L.* 35-48 mm. ♂ Head and thorax orange, face dark indigo-blue. Forewings light yellowish-grey, sometimes darker posteriorly: an orange basal patch, costal portion dark indigo-blue. Hindwings light ochreous-yellow, apex sometimes suffused with fuscous.

♀. Head and thorax ochreous-yellow. Forewings ochreous-yellow; two dark indigo-blue spots on costa and fold beyond middle. Hindwings light ochreous-yellow.

England, Aberdeen (?), E. Ireland, not common; C. Europe, WC. and N. Asia, Japan; 7, 8. Larva dark reddish-grey, hairs black and grey; dorsal area pale yellow streaked with dark grey; 4, 8, 12 with blackish dorsal marks; a subdorsal series of red tubercles; some fine yellowish lines on sides; head black: on lichens; 9-7.

2. Lithosia, *F.*

Head smooth. Ocelli absent. Antennae in ♂ ciliated, with longer setae at joints. Palpi moderate or short, subascending, shortly rough-scaled. Thorax smooth beneath. Abdomen rough-haired towards base. Tibiae smooth-scaled. Forewings: 3 and 4 stalked, 5 absent, 7 and 8 out of 9, 10 separate or connected by bar with 9, 11 anastomosing with 12. Hindwings: 3 and 4 stalked, 5 absent, 6 and 7 stalked, 8 from middle of cell.



Neuration of *Lithosia lurideola*: a, portion of ♂ antenna.

A genus of some extent in the Indo-Malayan region, less numerous in Europe. Imago with forewings very elongate. Larva with tufts of rather short hairs. The variation of structure in vein 10 of the forewings occurs in all the species, and, though curious, is of no importance.

1. Forewings with several black dots . . 6. *muscerda*.
   ,, without black dots . . . 2.
2. Forewings wholly orange . . 9. *sororcula*.
   ,, not orange . . . . 3.
3. Forewings with a costal orange or ochreous streak 4.
   ,, with at most costal edge orange . 7.
4. Costal streak attenuated to a point . 3. *complana*.
   ,, equally wide throughout . . 5.
5. Hindwings light yellowish . . 4. *lurideola*.
   ,, more or less grey . . . 6.
6. Forewings rather dark grey . . 2. *sericea*.
   ,, yellowish-grey . . 5. *deplana* ♀
7. Forewings with basal subcostal orange suffusion 5. *deplana* ♂
   ,, without orange subcostal suffusion 8.
8. Costa of forewings hardly arched . 1. *lutarella*.
   ,, ,, moderately arched . . 9.
9. Hindwings whitish . . . 8. *caniola*.
   ,, pale yellowish or grey . 7. *griseola*.

1. **L. lutarella**, *L.* (*pygmaeola*, Dbld.) 24-28 mm. Head ochreous-yellow, face sometimes grey. Forewings with costa

hardly arched; whitish-ochreous, sometimes greyish-tinged. Hindwings whitish-ochreous, yellowish-tinged; costa broadly suffused with grey.

Kent (Deal), on coast sandhills, very local; C. Europe, WC. and N. Asia; 8. Larva brown, hairs short, brown; dorsal line black; subdorsal dark brown; spiracular whitish; head black: on saline lichens; 9-6.

2. **L. sericea,** *Gregs.* (*molybdeola,* Gn.) 30-32 mm. Head and collar orange. Forewings with costa gently arched; rather dark grey; a whitish-ochreous costal streak, becoming orange on costa, posteriorly attenuated and not reaching apex; cilia greyish-orange, tips paler. Hindwings light ochreous-yellowish, suffused with grey dorsally, sometimes more or less wholly.

Cheshire, Lancashire, local; not yet found elsewhere; 7. Larva blackish-grey, hairs short, brown; dorsal line black; subdorsal interrupted, orange-red, white-spotted; lateral black; spiracular ferruginous, black-edged; head black: on lichens, dead leaves, etc.; 8-5. It is uncertain whether this is anything more than a local form of *L. complana*; the larvae are practically identical.

3. **L. complana,** *L.* 30-32 mm. Head and collar deep orange. Forewings with costa gently arched; rather light grey; a suffused orange costal streak, equally broad throughout; cilia light orange. Hindwings ochreous-yellow.

England to Lancashire, N. and E. Ireland, local; Europe, Asia Minor; 7. Larva blackish-grey or brown, hairs short, brown; dorsal line black; subdorsal forming a series of oval orange-red and white spots; spiracular rather broad, ferruginous; head blackish: on lichens; 8-6.

4. **L. lurideola,** *Zk.* (*complanula,* B.) 31-33 mm. Head orange. Collar orange, middle more or less grey. Forewings with costa posteriorly arched; rather dark grey; a whitish-ochreous costal streak, becoming orange on costa, posteriorly attenuated and not reaching apex; cilia whitish-ochreous, towards base orange. Hindwings light ochreous-yellow.

Britain to Caledonian Canal, W. Ireland, common; C. and S. Europe, Asia Minor; 7. Larva very dark grey, hairs black and yellowish; dorsal and subdorsal lines black; spiracular orange; head black: on lichens, oak, *Rhamnus,* etc.; 8-6.

5. **L. deplana,** *Esp.* (*helvola,* Hb.) 28-32 mm. Head and collar greyish-orange. Forewings of ♂ ochreous-grey, with a subcostal orange suffusion towards base, costal edge posteriorly and cilia orange; of ♀ yellowish-grey, with posteriorly attenu-

ated costal streak and cilia orange. Hindwings ochreous-grey.

England to York, very local; C. Europe, N. Asia, Japan; 7. Larva grey, tinged with brown or green, back paler or whitish, hairs grey; dorsal line double, black, interrupted; subdorsal black, interrupted; black dorsal spots on 4 and 8; a white subdorsal spot on 9; head dark grey, black-marked: on lichens; 8-6.

6. **L. muscerda,** *Hufn.* 26-28 mm. Head and collar light grey. Forewings light grey, slightly brown-tinged; two black dots obliquely placed towards fold before middle; an oblique series of four black dots from costa beyond middle, reaching half across wing. Hindwings pale brownish-grey, darker towards apex.

Suffolk, Norfolk, Cambridge, in fens, local; C. Europe; 7, 8. Larva blackish-brown, mixed with reddish-grey, hairs dark brown; dorsal and subdorsal lines black; subspiracular reddish-grey, interrupted; two deep red spots on 2, and one on 13; head black: on lichens and dead leaves; 8-6.

7. **L. griseola,** *Hb.* (*stramineola,* Dbld.) 32-36 mm. Head and collar ochreous-yellowish. Forewings with costa evenly arched; varying from light grey to whitish-ochreous; costa slenderly ochreous-yellow. Hindwings pale ochreous-yellowish, often suffused with pale grey.

England to York, in marshy places, common; C. Europe, N. Asia; 7-8. Larva blackish-brown, hairs dark brown; dorsal line black; subdorsal orange-ochreous, interrupted, enlarged and partly confluent on 2, 3, and 13, elsewhere sometimes faint; head shining black: on lichens and dead leaves; 8-6.

8. **L. caniola,** *Hb.* 28-30 mm. Head and collar orange. Forewings with costa evenly arched; grey-whitish; costal edge orange. Hindwings yellow-whitish.

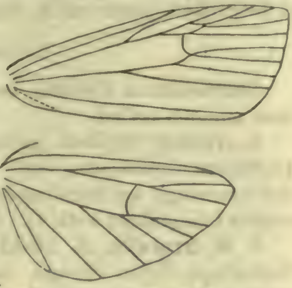
Sussex, Devon, Pembroke, Isle of Man, E. Ireland, on coasts, very local; S. Europe; 8. Larva grey or brown, hairs brown; dorsal line black; subdorsal orange-red, black-edged, sometimes marked with white dots; head dark brown: on lichens, and flowers of *Lotus;* 8-6.

9. **L. sororcula,** *Hufn.* (*aureola,* Hb.) 27-29 mm. Head and thorax orange. Forewings with costa rather strongly arched; orange. Hindwings pale orange.

Kent to Wilts and Norfolk, in woods of fir and beech, local; C. Europe, Asia Minor to N. Persia; 5, 6. Larva whitish or yellowish, hairs fuscous; dorsal, subdorsal, and broader lateral lines black; blackish dorsal patches on 4, 8, 12; a whitish patch on 9; tubercles orange-red; sides fuscous; head blackish: on lichens; 7-10.

3. GNOPHRIA, *Stph.*

Head with appressed scales. Ocelli small. Antennae in ♂ ciliated, with longer setae at joints. Palpi moderate, subascending, shortly rough-scaled. Thorax smooth beneath. Abdomen smooth-scaled. Tibiae smooth-scaled. Forewings: 4 and 5 connate, 6, 7, and 8 out of 9, 10 connected with 9, 11 approximated to 12. Hindwings: 4 and 5 stalked, 6 and 7 stalked, 8 from middle of cell.


Neuration of *Gnophria rubricollis.*

There is only one species known; the genus originates rather remotely from *Miltochrista.* Imago with forewings very elongate. Larva with tufts of rather scanty hairs.

1. **G. rubricollis,** *L.* 28-32 mm. Head blackish, collar red. Abdomen blackish, apical half ochreous-orange. Wings wholly blackish.

Britain to Caledonian Canal, N. and W. Ireland, common; N. and C. Europe, WC. and N. Asia; 6. Larva grey, freckled with greenish-yellow, hairs brownish; dorsal line fine, whitish, grey-edged; subdorsal black, interrupted; head blackish: on lichens; 7-10. The imago sometimes flies in companies round oaks in the sunshine.

4. CYBOSIA, *Hb.*

Head smooth. Ocelli absent. Antennae in ♂ ciliated, with longer setae at joints. Palpi short, porrected, loosely scaled. Thorax somewhat hairy beneath. Abdomen hairy. Tibiae smooth-scaled. Forewings: 7 and 8 out of 9, 11 anastomosing with 12. Hindwings: 4 and 5 stalked, 6 and 7 stalked, 8 from middle of cell.

Also restricted to a single species. Larva with dense tufts of hairs, when young spatulate, afterwards finely and densely branched on back.

1. **C. mesomella,** *L.* 29-32 mm. Head and collar light ochreous-orange. Forewings ochreous-whitish; costa narrowly

suffused with ochreous-orange; two blackish subcostal and subdorsal dots beyond middle; termen orange-tinged; cilia light orange, tips whitish. Hindwings brownish-grey, darker posteriorly; cilia pale orange, tips whitish.

Britain to the Clyde, Ross, rather common; N., C., and SE. Europe, WC. and N. Asia; 7. Larva blackish, hairs black; a deep black patch on 2; head black: on lichens; 8-5.

5. SETINA, *Schrk.*

Characters of *Cybosia*, but thorax not hairy beneath; abdomen smooth-scaled.

A rather limited genus, mainly Asiatic, with several European representatives. In exotic species veins 6 and 7 of the forewings are sometimes stalked, 5 of hindwings sometimes absent (coincident with 4). Larva with tufts of rather long hairs.

1. **S. irrorella**, *L.* 26-32 mm. Head black, collar orange. Forewings light orange, margins darker; antemedian, postmedian, and subterminal series of black dots, last sometimes reduced to one or two. Hindwings pale orange; a subapical blackish dot.

S. England to Warwick, Isle of Man, Lanark, Argyll, Kincardine, local; N. and C. Europe; 6, 7. Larva blackish-brown, on sides dark reddish-grey or purplish-grey, hairs blackish; a dorsal series of bright yellow spots; subdorsal dull yellow, interrupted; spiracular bright yellow, interrupted; head black: on lichens; 9-5.

6. MILTOCHRISTA, *Hb.*

Head with appressed scales. Ocelli absent. Antennae in ♂ ciliated, with longer setae at joints. Palpi moderate, subascending, rough-scaled. Thorax somewhat hairy beneath. Abdomen hairy. Tibiae smooth-scaled. Forewings: 6 sometimes out of 9, 7 and 8 out of 9, 11 approximated to 12. Hindwings: 5 remote from 4, 6 and 7 stalked, 8 from near end of cell.

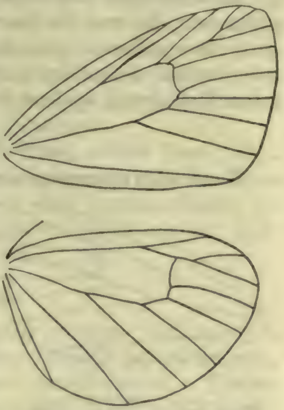
An Indo-Malayan genus of considerable extent, correlated with *Nudaria* and *Uraba;* the European species are stragglers only. Larva with very dense tufts of hairs, some densely and finely branched.

Wings rosy	1. *miniata.*
„ not rosy	2. *senex.*

1. **M. miniata,** *Forst.* 26-28 mm. Head and thorax rosy. Forewings ochreous-rosy, costa and termen rather broadly deep

rosy; costal edge black towards base; a black subbasal dot; lines fine, blackish, obsolete on dorsum, first angulated above middle, second very acutely angulated near costa, very strongly dentate in disc; a black discal dot; a subterminal series of black dots. Hindwings pale rosy, termen darker.

England to York, in woods, common; N. and C. Europe, WC. and N. Asia; 7. Larva deep greyish-ochreous, hairs blackish-grey: on lichens; 8-5.



Neuration of *Miltochrista senex.*

2. **M. senex,** *Hb.* 20-22 mm. Head and thorax pale greyish-ochreous, face fuscous. Forewings light greyish-ochreous; a blackish subbasal dot; first and second lines formed of blackish dots; a cloudy dark grey median line sometimes visible on margins; a large blackish discal dot; an apical fuscous suffusion. Hindwings pale greyish-ochreous, posteriorly fuscous-sprinkled; a dark grey crescentic discal mark.

England to York, in marshy places, local; N. and NC. Europe; 7, 8. Larva deep reddish-grey, hairs brownish; head black: on lichens; 8-5.

7. NUDARIA, *Hw.*

Head densely rough-haired. Ocelli absent. Antennae in ♂ evenly ciliated, basal joint rough-haired anteriorly. Palpi rather short, subascending, rough-scaled. Thorax smooth beneath. Abdomen hairy. Tibiae smooth-scaled. Forewings: 6 and 8 out of 9, 7 absent. Hindwings: 4 and 5 rather approximated, 6 and 7 stalked, 8 from middle of cell.

It is doubtful whether any other species can be referred to this genus, which is correlated with *Uraba.* Larva with tufts of long fine hairs.

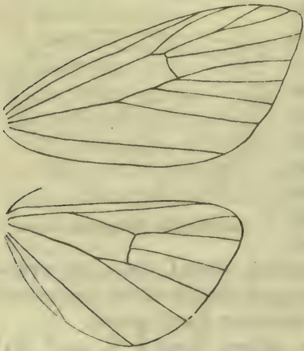
1. **N. mundana,** *L.* 19-22 mm. Head and thorax fuscous-whitish. Forewings very pale greyish-ochreous, transparent; costal edge fuscous near base; a fuscous subbasal dot; lines fuscous, irregular, first angulated in middle, second angulated above middle; a dark fuscous discal dot; a faint cloudy pale

greyish subterminal line, connected with termen in middle. Hindwings transparent, faintly ochreous-tinged.

Britain to the Clyde, Kincardine, N. and W. Ireland, rather common; N. and C. Europe, Asia Minor; 7-8. Larva pale grey-brown, dorsal area bright pale yellow, hairs rather dark grey-brown; dorsal line dark fuscous; subdorsal blackish-brown; a blackish dorsal spot on 8; head dark brown: on lichens; 9-5.

8. Roeselia, *Hb.*

Head with appressed scales, forming a short facial projection. Ocelli present. Antennae in ♂ ciliated with fascicles, sometimes rising from very short pectinations, basal joint densely tufted in front. Palpi moderately long, straight, porrected, rough-scaled. Thorax smooth beneath. Abdomen smooth-scaled, with small dorsal crest. Tibiae smooth-scaled. Forewings with scale-tufts on surface; 7 absent, 8 and 9 stalked, 10 absent. Hindwings: 4 absent, 5 parallel to 3, 6 and 7 stalked, 8 from middle of cell.


Neuration of *Roeselia confusalis.*

A genus of some extent and rather general distribution, but most numerous in Australia. Larva with tufts of hairs, without prolegs on 7.

Collar wholly white . . . . 1. *centonalis.*
„ with a fuscous band . . . . 2. *confusalis.*

1. **R. centonalis,** *Hb.* 17-19 mm. Head and thorax white. Forewings white, more or less partially sprinkled or suffused with brown; an irregular fuscous spot on base of costa; first, median, and second lines blackish, angulated near costa, space between median and second brown, median line itself often nearly obsolete; subterminal white, anteriorly often blackish-edged, margins suffused with brown. Hindwings light grey; sometimes a darker discal dot.

Kent, I. of Wight, scarce; C. Europe, WC. and N. Asia; 7. Larva dull pink or purplish-pink, hairs grey-brown; dorsal line ochreous-yellow, interrupting a series of black V-shaped marks; a subdorsal series of black linear marks; spiracular very faint, yellowish; head black-brown: on *Trifolium*, *Lotus*, etc.; 9-5.

2. **R. confusalis**, *HS.* (*cristulalis*, Dup.) 18-20 mm. Head and thorax white with a few fuscous scales, collar with a fuscous band. Forewings white, fuscous-sprinkled; first and second lines fuscous, black-dotted, strongly curved; a fuscous spot in disc beyond first line, and another on costa before second; subterminal line white, margins suffused with fuscous, anterior sometimes blackish-dotted. Hindwings light grey, in ♂ more whitish on dorsal half; a dark grey discal spot.

Britain to the Clyde, N. and W. Ireland, rather local; WC. Europe; 5, 6. Larva dull reddish, dorsal area yellowish, hairs brownish, some much longer; dorsal line double, black, interrupted, on 8-10 forming ferruginous V-shaped marks; subdorsal black: on oak, apple, etc.; 7-10.

9. NOLA, *Lch.*

Head with appressed scales. Ocelli present. Antennae in ♂ bipectinated to near apex, basal joint densely tufted in front. Palpi rather long, straight, porrected, rough-scaled. Thorax smooth beneath. Abdomen smooth-scaled, with small dorsal crest. Middle and posterior tibiae rough-haired above. Forewings with scale-tufts on surface; 7 absent, 8 and 10 out of 9. Hindwings: 4 absent, 5 parallel to 3, 6 and 7 stalked, 8 from middle of cell.

Includes a few scattered species. Larva with tufts of hairs, without prolegs on 7.

1. **N. cucullatella**, *L.* 17-19 mm. Head and thorax white, sprinkled or barred with fuscous. Forewings white, mixed and posteriorly suffused with grey and fuscous; basal area suffused with dark fuscous, limited by thick blackish curved first line; a fuscous suffusion on middle of costa; second line blackish, waved, sinuate. Hindwings grey, paler towards base.

England, common; Europe; 7. Larva pale grey, sides sometimes brown, hairs grey, tubercles reddish; dorsal line pale, dark-edged, traversing several dark grey patches: on blackthorn, hawthorn, apple, etc.; 8-5.

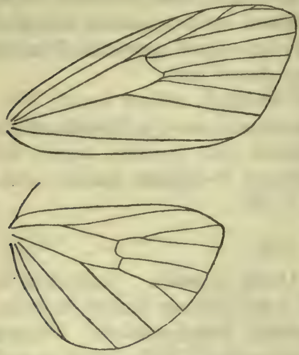
10. URABA, *Walk.*

Characters of *Nola*, but head rough-scaled; patagia sometimes tufted; 7 of forewings present, out of 9; hindwings with 3 and 4 stalked.

A small but nearly cosmopolitan genus, related to the following, though the mode of connection is obscure. Larva with tufts of rather long hairs, without prolegs on 7.

Head and thorax wholly white . . 2. *albula.*
" " not wholly white . . 1. *strigula.*

1. **U. strigula,** *Schiff.* 18-21 mm. Head white, face grey-sprinkled; collar grey, with a white blackish-edged anterior transverse bar. Thorax white, anterior edge blackish. Forewings ochreous-whitish, finely sprinkled with fuscous and black; costa blackish-marked towards base; first and second lines blackish, sinuate, sharply angulated near costa; a blackish spot on middle of costa; median line indistinct, grey, angulated; subterminal white, margins suffused with blackish irroration, anterior black-marked. Hindwings rather dark grey.


Neuration of *Uraba strigula.*

England, W. Ireland, local; C. and SE. Europe, Asia Minor; 6, 7. Larva pale ochreous, sometimes pink-tinged, hairs pale brownish or yellowish, some at extremities very long; dorsal line broad, yellowish, fuscous-edged; subdorsal fuscous, interrupted; a blackish-grey blotch on 7: on oak; 8-6.

2. **U. albula,** *Hb.* 18-20 mm. Head and thorax white, patagia tufted. Forewings white, partially brownish-tinged; two brown spots on costa towards base; first line brown, obtusely angulated; second twice sinuate, often limiting a suffused brown band including darker brown obtusely angulated median line; subterminal white, margins brown. Hindwings ochreous-whitish, disc sprinkled and termen suffused with light grey.

Kent, local; C. Europe, Asia Minor; 7. Larva whitish, pale pink, or orange, hairs whitish, a few much longer and dark brown; dorsal line double, grey; subdorsal black, interrupted: on bramble (*Rubus*); 8-6.

11. Sarrothripus, *Curt.*

Head smooth-scaled, with rough projecting tuft between antennae. Ocelli present. Antennae in ♂ shortly ciliated. Palpi very long, porrected, rough-scaled throughout. Thorax with small posterior crest, smooth beneath. Abdomen smooth-scaled. Anterior femora and tibiae densely tufted with long rough scales, posterior tibiae smooth-scaled. Forewings: 9

and 10 out of 8. Hindwings: 3 and 4 connate, 5 absent, 6 and 7 closely approximated at base, 8 from middle of cell.

A small genus, widely distributed but mainly tropical, especially Malayan, only one occurring in Europe; although so dissimilar to the three following, it is undoubtedly more allied to them and especially to *Earias* than to any other. Larva without hair-tufts. Cocoon boat-shaped.

1. **S. undulana**, *Hb.* (*revayana*, Tr.) 23-27 mm. Forewings varying from grey to brown; sometimes some black subbasal markings; first and second lines sinuate-waved, more or less distinctly dark-margined: median area often darker or browner towards costa; a small round brown or black discal spot, sometimes obsolete; sometimes some blackish spots before first line, and on anterior edge of subterminal. Hindwings light grey, terminally darker.

Britain to Ross, S. Ireland, local; Europe, N. and WC. Asia; 7-4. Larva green; dorsal line darker; head reddish-brown: on *Salix caprea;* 5, 6.

12. EARIAS, *Hb.*

Head smooth-scaled, with rough projecting tuft between antennae. Ocelli present. Antennae in ♂ ciliated. Palpi moderate, subascending, second joint thickened with dense loosely appressed scales. Thorax smooth beneath. Abdomen smooth-scaled. Tibiae smooth-scaled. Forewings: 7 and 8 out of 9. Hindwings: 3 and 4 stalked, 5 absent, 6 and 7 connate, 8 from middle of cell.

Includes about forty species, mostly Asiatic, though stray representatives occur almost everywhere. Larva without hair-tufts. Cocoon boat-shaped.

1. **E. clorana**, *L.* 18-22 mm. Head white. Forewings bright green; costa white, more broadly towards base. Hindwings white.

Kent to Dorset and Norfolk, local; N. and C. Europe, N. and WC. Asia; 5, 6. Larva whitish, sometimes pinkish-tinged: narrow dorsal and broad subdorsal, lateral, and spiracular lines light ferruginous-brown, subdorsal much darker on 2-5 and front of 6 and 12; subspiracular white; pairs of rather pointed tubercles on 3, 4, 6, and 12; head pale green, black-marked: amongst spun leaves of *Salix viminalis;* 7, 8.

13. HYLOPHILA, *Hb.*

Head smooth-scaled. Ocelli present. Antennae in ♂ shortly ciliated. Palpi short, ascending, with appressed scales. Thorax thinly hairy beneath. Abdomen smooth-scaled. Tibiae smooth-scaled. Forewings: 9 and 10 out of 8. Hindwings: 3 and 4 connate, 5 approximated to 4, 6 and 7 connate, 8 from middle of cell.

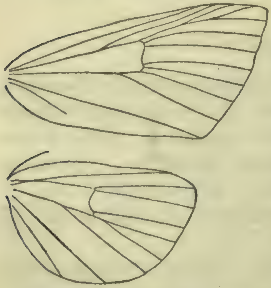
Two or three species found in temperate Asia are assigned to the same genus. Larva without hair-tufts. Cocoon boat-shaped.

1. **H. bicolorana**, *Fuesl.* (*quercana*, Schiff.) 40-45 mm. Head green, face red beneath. Forewings bright green; costal edge pale yellowish; first and second lines straight, oblique, parallel, pale yellowish; cilia white. Hindwings white.

S. England to Hereford and Norfolk, E. and W. Ireland, not uncommon; C. and S. Europe, WC. Asia to N. Persia; 7. Larva green; subdorsal line yellowish: on oak; 5.

14. HALIAS, *Tr.*

Head rough-haired. Ocelli present. Antennae slightly fusiform, in ♂ simple. Palpi moderately long, ascending, rough-haired. Thorax hairy beneath. Abdomen hairy towards base. Tibiae smooth-scaled. Forewings: 9 and 10 out of 8. Hindwings: 3 and 4 stalked, 5 approximated to 4, 6 and 7 connate, 8 from before middle of cell.



Neuration of *Halias prasinana.*

Perhaps confined to the single species. Larva without hair-tufts. Cocoon boat-shaped. Although showing relationship to the group of *Callimorpha* and the exotic family *Agaristidae* (which also originate from *Callimorpha*), the actual ancestry of this curious form is obscure.

1. **H. prasinana**, L. 31-35 mm. Head green, sides of face red. Antennae reddish. Forewings green, median area darker; costal edge posteriorly crimson; first, second, and subterminal lines snow-white, nearly straight, oblique, parallel, first and second more or less suffused; cilia crimson, more or less mixed with yellow. Hindwings in ♂ light yellowish, in ♀ white.

Britain to Ross, N. and E. Ireland, common; N. and C. Europe, N. Asia; 5, 6. Larva light green, sprinkled with yellow dots; subdorsal line yellow; anterior edge of 2 reddish: on oak, beech, hazel, etc.; 7-9. The imago makes a peculiar stridulatory noise when flying.

15. TYRIA, *Hb.*

Head with loosely appressed hairs. Ocelli large. Antennae in ♂ ciliated, with longer setae at joints. Palpi short, porrected, rough-scaled. Thorax hairy beneath. Abdomen smooth-scaled. Femora somewhat hairy, tibiae smooth-scaled. Forewings: 6 sometimes out of 9, 7 and 8 out of 9, 10 out of 9, 11 connected with 9. Hindwings: 3, 4, 5 rather approximated, 6 and 7 connate or short-stalked, 8 from middle of cell.

Only one species is known. Larva with scanty hairs. This and the following genus are allied to the extensive Indo-Malayan genus *Nyctemera*, ranging to S. Africa and New Zealand.

1. **T. jacobaeae**, *L.* 35-44 mm. Head, thorax, and abdomen black. Forewings blackish-grey; a crimson subcostal streak from base to $\frac{5}{6}$, extremity expanded; a crimson dorsal streak from base to $\frac{2}{3}$; a crimson terminal spot below apex, and another above tornus. Hindwings crimson; a costal streak, middle of terminal edge, and cilia blackish-grey.

Britain to Caledonian Canal, Ireland, common, scarce north of the Clyde; Europe, WC. Asia; 5, 6. Larva orange, hairs black; each segment with a thick black ring; head black: on *Senecio jacobaea* and *S. vulgaris;* 7, 8. The conspicuous larval colouring is a warning-signal, the larva being uneatable.

16. UTETHEISA, *Hb.*

Head smooth. Ocelli large. Antennae in ♂ ciliated, with longer setae at joints. Palpi moderate, ascending, with loosely appressed scales. Thorax smooth beneath. Abdomen smooth-scaled. Tibiae smooth-scaled, spurs very short. Forewings: 7 and 8 out of 9, 10 connected with 9. Hindwings: 3, 4, 5 rather approximated, 6 and 7 connate or short-stalked, 8 from middle of cell.

A small genus, inhabiting the warmer regions of the world; only one species reaches Europe. Larva with rather scanty hairs, some finely branched.

1. **U. pulchella**, *L.* 28-38 mm. Head and thorax whitish, black-dotted, often orange-marked. Forewings ochreous-whitish; five transverse series of crimson spots, alternating with six series of black dots; second to fifth series of dots angulated, fifth partly double, sixth terminal. Hindwings white; sometimes one or two blackish discal marks; a very irregular-edged blackish terminal fascia, broadest at apex and below middle.

England, Roxburgh, S. Ireland, occasional, not permanently resident; C. and S. Europe, Asia, Africa, Australia, New Zealand; 6, 8, 9. Larva dark grey, dull purplish, or blackish, often with orange-red transverse bars on each segment; hairs black and whitish; dorsal area more or less white-marked; spiracular line often whitish; head reddish-ochreous, blackish-marked: on *Myosotis*, grasses, etc.; 7, 8, 10-5. This species has been several times taken on open sea, 500 miles or more from land.

17. Coscinia, *Hb.*

Head with short rough or loosely appressed hairs. Ocelli present. Antennae in ♂ bipectinated to apex. Palpi moderate or short, porrected, with long rough hairs. Thorax hairy beneath. Abdomen smooth-scaled. Tibiae smooth-scaled. Forewings: 7 absent, 8 and 10 out of 9. Hindwings: 3 and 4 connate or stalked, 5 absent, 6 and 7 connate or stalked, 8 from middle of cell.

A very small European genus, with one or two species elsewhere. Larva with tufts of hairs.

Hindwings grey	1. *cribrum*.
„ orange	2. *striata*.

1. **C. cribrum**, *L.* 33-35 mm. Forewings white, somewhat blackish-sprinkled; five cloudy blackish-grey more or less interrupted transverse streaks, second angulated; two longitudinal cloudy blackish-grey streaks in disc above and below middle; a transverse sometimes interrupted blackish discal mark; a terminal series of blackish-grey marks. Hindwings rather dark grey, sometimes dorsally yellowish-tinged.

Hants, Dorset, Derby (?), very local; Europe, Asia Minor, N. Africa; 7. Larva brown, tubercles black, hairs black and whitish; dorsal line pale or whitish; subdorsal sometimes whitish; head dark brown: on grasses, *Erica*, etc.; 8-5.

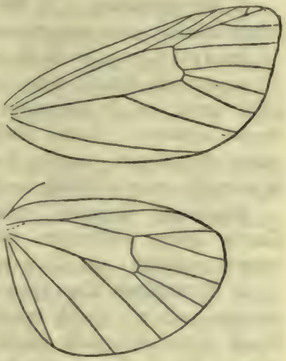
2. **C. striata**, *L.* (*grammica*, *L.*) 34-38 mm. Forewings whitish-ochreous, yellowish-tinged; interneural spaces streaked with black except towards termen; veins towards termen streaked with black; two black discal dots transversely placed; cilia light orange. Hindwings orange, sometimes slightly black-sprinkled; veins blackish-suffused towards base; a blackish band along costa and termen, not reaching tornus; a black discal crescentic mark.

Berks, Anglesea, York (?), probably casual immigrants only, not for many years; Europe, Asia Minor, Syria; 7. Larva blackish, tubercles yellowish, hairs brown; dorsal line orange-yellow; spiracular whitish; head black: on grasses, *Erica*, etc.; 8-5.

18. PHRAGMATOBIA, *Stph.*

Head rough-haired. Ocelli present. Antennae in ♂ ciliated, with longer setae at joints. Palpi moderately long, porrected, rough-haired. Thorax densely hairy above and beneath. Abdomen hairy. Femora hairy beneath, tibiae smooth-scaled. Forewings: 7 and 8 out of 9, 10 out of 9, 11 connected with 9. Hindwings: 3 and 4 sometimes connate, 5 approximated, 6 and 7 connate or stalked, 8 from middle of cell.

A rather small genus, mainly inhabiting northern temperate regions. Larva with dense tufts of rather long hairs.



Neuration of *Phragmatobia fuliginosa.*

1. **P. fuliginosa,** *L.* 28-34 mm. Abdomen red, black-spotted. Forewings reddish-brown, more thinly scaled in disc; a black discal dot. Hindwings rose-pink; costal half suffused with thinly strewn black scales, appearing grey; two obliquely placed blackish discal dots; a terminal blackish suffused sometimes interrupted fascia; cilia rose-pink.

Britain to the Orkneys, N. Ireland, common; Europe, W. and N. Asia; 5, 6. Larva dark grey or brown, hairs brown, reddish, or ochreous; head black: on grasses, *Rumex*, *Myosotis*, etc.; 8-4.

19. DIACRISIA, *Hb.*

Characters of *Phragmatobia*, but antennae of ♂ bipectinated to apex; forewings with 11 separate.

This genus is of some extent, and nearly cosmopolitan. Larva with tufts of moderate or long hairs.

1. Dorsum of forewings crimson or ferruginous . . . 5. *russula.*
„ „ not crimson or ferruginous . . . 2.
2. Abdomen orange-yellow . . . . . 3.
„ not orange-yellow . . . . 1. *mendica.*

3. Hindwings spotted . . . . . 4.
„ not spotted . . . . 2. *urticae*.
4. Forewings with median series of black dots
3. *menthastri*.
„ without median series of black dots
4. *lubricipeda*.

1. **D. mendica**, *Cl.* 30-38 mm. Abdomen grey or white, with lateral and sometimes dorsal black spots. Forewings in ♂ brownish-grey or dark grey, in ♀ ochreous-white; from 3 to 10 scattered black dots. Hindwings in ♂ brownish-grey or dark grey, in ♀ ochreous-white; six blackish dots, all sometimes absent. Local forms occur with the black markings more developed, rarely forming streaks. In Ireland the ♂ is usually grey-whitish or ochreous-whitish.

England, Ireland, common; Europe, WC. Asia; 5, 6. Larva grey, tubercles reddish, hairs brown-reddish; head brown-reddish: on *Rumex*, *Myosotis*, *Plantago*, etc.; 7-9.

2. **D. urticae**, *Esp.* (*papyratia*, Marsh) 38-40 mm. Abdomen orange-yellow, black-spotted. Forewings white; two small black dots obliquely placed in disc; sometimes three or four minute black dots towards base and apex. Hindwings white.

England, Lanark, Ross, local; N. and C. Europe, N. Asia; 6. Larva dark brown, hairs dark grey; spiracles white; head blackish: on *Rumex*, *Mentha*, etc.; 7-9.

3. **D. menthastri**, *Esp.* 35-42 mm. Abdomen orange-yellow, black-spotted. Forewings ochreous-whitish; black basal and subbasal dots; first, median, and second lines formed by angulated series of black dots; two obliquely placed black discal dots, lower often double; an irregular subterminal series of pairs of black dots. Hindwings ochreous-white; a black discal spot; three subterminal pairs of black dots, often partly absent.

Britain to Ross, Ireland, abundant; Europe, WC. and N. Asia; 5, 6. Larva brown, hairs long, brown; dorsal line ochreous; spiracles white; head black: on *Plantago*, *Mentha*, *Rumex*, etc.; 7-9.

4. **D. lubricipeda**, *L.* 34-40 mm. Abdomen orange-yellow, black-spotted. Forewings light ochreous-yellow or whitish-ochreous; first line forming a black costal spot, and subdorsal dot; two or three obliquely placed black discal dots; costal end of second line sometimes black; lower part of second and upper of subterminal forming a straight series of pairs of black dots, sometimes obsolete in disc, lowest enlarged. Hindwings

light yellowish or ochreous-whitish; a black discal spot; sometimes three or four subterminal black dots.

Britain to Ross, Ireland, very common; N. and C. Europe, N. Asia; 5, 6. Larva grey or brown, hairs brown; dorsal line sometimes pale or whitish; spiracular whitish, spiracles white; head grey-yellowish: on *Rumex*, *Plantago*, *Mentha*, etc.; 7-9.

5. **D. russula,** *L.* 35-46 mm. ♂. Forewings dull yellow, dorsum suffused with crimson; an 8-shaped crimson discal spot, mixed with dark grey; costal edge posteriorly and cilia light crimson. Hindwings grey-whitish or ochreous-whitish; a blackish sinuate discal spot, and subterminal band; cilia crimson.

♀. Forewings deep orange; veins, costa, dorsum, discal spot, and cilia ferruginous. Hindwings orange; basal half blackish, confluent with large black discal spot, and dorsally with a blackish subterminal band.

Britain to Ross, somewhat locally common; Europe, WC. and N. Asia; 6. Larva brown, tubercles blackish, hairs brown; dorsal line ochreous or orange; spiracles ochreous or white; head dark brown: on *Hieracium*, *Erica*, *Scabiosa*, etc.; 8-5.

20. Arctia, *Schrk.*

Characters of *Diacrisia*, but 10 rising separate, anastomosing or connected with 9.

A rather limited genus, principally characteristic of northern temperate regions. Larva with tufts of long hairs.

1. Hindwings red . . . . . 3. *caja*.
„ orange . . . . 2.
2. Base of hindwings black or black-marked 1. *plantaginis*.
„ „ not black-marked . 2. *villica*.

1. **A. plantaginis,** *L.* 33-36 mm. Forewings black; costa anteriorly orange; two anterior costal spots, a broad irregular streak along fold, and two posterior fasciae anastomosing in middle pale ochreous-yellow, sometimes variably interrupted or confluent; cilia orange. Hindwings orange; basal area black or with two black longitudinal streaks, upper reaching a black discal spot; two or three posterior black spots; a terminal series of partially connected black spots.

Britain to the Shetlands, Ireland, common, somewhat local; N. and C. Europe, N. Asia; 5, 6. Larva black; hairs black or dark brown, on 5-7 bright brown-reddish, sometimes some on sides reddish; head black: on *Myosotis*, *Plantago*, etc.; 8-4.

2. **A. villica,** *L.* 50-58 mm. Thorax black, with a whitish spot on shoulder. Abdomen orange, posteriorly crimson, with black dorsal dots. Forewings black; about eight whitish-yellowish spots or blotches, sometimes variably confluent. Hindwings orange; four or five small black spots; an apical black orange-spotted blotch.

England, Roxburgh, local; Europe, WC. Asia; 6. Larva black, hairs dark brown; spiracles sometimes white; head deep red: on *Myosotis, Plantago, Rumex,* etc.; 8-5.

3. **A. caja,** *L.* 50-75 mm. Thorax dark brown, collar red-edged. Abdomen red, black-spotted. Forewings very dark brown; a narrow anterior fascia, two costal spots, two posterior narrow fasciae anastomosing in middle, and a submedian streak ochreous-white, variably interrupted or partly connected. Hindwings red; about six large variable deep indigo-blue black-edged spots, finely orange-margined.

Britain to the Orkneys, Ireland, very common; Europe, N. Asia, N. America; 7. Larva black; hairs very long, black and grey, on sides browner, on 2 and 3 reddish-brown; head black: on *Urtica, Plantago,* etc.; 8-5.

21. CALLIMORPHA, *Latr.*

Head with appressed hairs. Ocelli present. Antennae in ♂ ciliated, with longer setae at joints. Palpi moderate, porrected, rough-scaled beneath. Thorax hairy beneath. Abdomen smooth-scaled. Tibiae smooth-scaled. Forewings: 7 and 8 out of 9, 10 sometimes connected with 9. Hindwings: 3, 4, 5 approximated, 6 and 7 connate or short-stalked, 8 from $\frac{1}{3}$ of cell.

A small genus, scattered over the northern hemisphere. Larva with tufts of hairs.

Forewings with pale fasciae and dorsal streak . 1. *hera.*
" " scattered spots . . 2. *dominula.*

1. **C. hera,** *L.* 52-58 mm. Head and collar light orange, black-marked. Thorax very dark olive-green, streaked with whitish-yellowish. Forewings very dark olive-green, markings whitish-ochreous; a short subdorsal streak from base; a dorsal streak throughout; three straight fasciae, first very oblique, not reaching dorsum, second and third confluent beneath, running to tornus and enclosing two black spots, tornus and extremity of third orange; one or two additional marks on costa. Hindwings red, with three or four black spots.

Devon, perhaps introduced but now well established; WC.

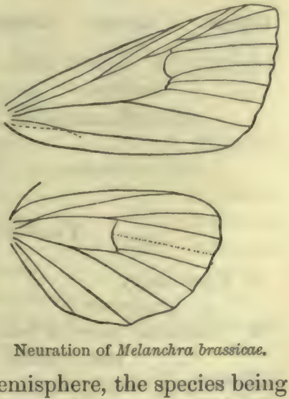
and S. Europe, W. Asia; 8. Larva purplish, tubercles ochreous, hairs light brown; dorsal line broad, ochreous, darker-edged; spiracular white, irregular; head black: on *Myosotis*, *Urtica*, *Plantago*, etc.; 9-5.

2. **C. dominula**, *L.* 52-58 mm. Head and thorax blue-black, thorax with two dorsal orange marks. Forewings dark indigo-green; an orange dorsal spot near base, and two near costa before middle; a spot in disc below middle, two or three larger posterior and some smaller subapical spots ochreous-whitish. Hindwings crimson; a black discal spot; an interrupted black crimson-spotted terminal band.

England to Lancashire, local; Europe, Asia Minor; 6. Larva black, white-marked, hairs black; dorsal and spiracular lines yellow, interrupted; head black: on *Myosotis*, *Urtica*, *Plantago*, etc.; 8-5.

2. CARADRINIDAE.

Ocelli usually distinct. Tongue usually well developed. Labial palpi moderate, more or less ascending, second joint densely scaled, usually rough, terminal rather short, obtuse. Thorax usually densely hairy beneath. Posterior tibiae with all spurs present. Forewings: 7 and 8 out of 9, 10 connected with 9. Hindwings: 3 and 4 connate or short-stalked, 5 obsolete or imperfect, parallel to 4, 6 and 7 connate or short-stalked or seldom closely approximated only, 8 shortly anastomosing with cell near base, thence evenly diverging (in *Stilbia* anastomosing to middle).



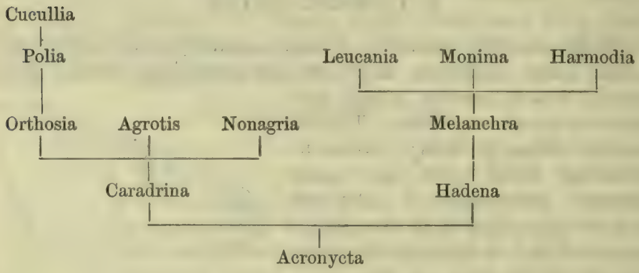
Neuration of *Melanchra brassicae.*

A dominant family in temperate regions, especially in the northern hemisphere, the species being very numerous and often occurring in great plenty; within the tropics, however, their place is largely taken by the *Plusiadae*. The structure is in most particulars remarkably uniform, the neuration and palpi being practically identical throughout the family. The markings are usually very similar, and the colouring dull and adapted to conceal insects which are accustomed to hide amongst dead leaves or refuse; hence this group is not one of the easiest or most attractive to study. The species are the most truly nocturnal of all the *Lepidoptera;* few are readily obtainable by day, but at night they are found in abundance at flowers or sugar. Imago with forewings usually elongate, body relatively stout, and densely scaled. It may be noted as an established conclusion that antennal pectinations, if not extending to the apex of the antennae, are in this family seldom sufficient to mark generic distinction.

Ovum spherical, more or less distinctly ribbed and reticulated. Larva usually with few hairs (except in the earliest forms), often nocturnal, sometimes subterranean; often very polyphagous. Pupa usually subterranean.

The phylogeny of the leading genera is expressed in the accompanying diagram.

Phylogeny of Caradrinidae.



Tabulation of Genera.

1. Eyes hairy . . . . . 2.
,, glabrous . . . . . 9.
2. Abdomen more or less crested . . . 3.
,, not crested . . . . 5.
3. Tongue short, slight; antennae of ♂ bipectinated to apex . . . 16. Neuronia.
,, well-developed; antennae of ♂ not bipectinated to apex . . . . 4.
4. Abdomen in ♀ acutely pointed . . 18. Harmodia.
,, ,, not acutely pointed 19. Melanchra.
5. Palpi very short, with long rough hairs . 17. Panolis.
,, normal . . . . . 6.

6. Antennae in ♂ bipectinated or acutely bidentate 7.
„ „ not bipectinated or acutely bidentate . . . 8.
7. Basal joint of antennae with hair-tuft . 14. Monima.
„ „ without hair-tuft . 15. Charaeas.
8. Tibiae with appressed scales . . 12. Meliana.
„ rough-scaled . . . . 13. Leucania.
9. Eyes ciliated . . . . . 10.
„ not ciliated . . . . . 20.
10. Face with rounded horny prominence 8. Aporophyla.
„ without horny prominence . . . 11.
11. Antennae in ♂ bipectinated to apex . . 12.
„ „ not bipectinated to apex . . 15.
12. Anterior tibiae with horny apical hook 7. Asteroscopus.
„ „ without apical hook . . 13.
13. Abdomen crested . . . 4. Valeria.
„ not crested . . . . 14.
14. Tongue short, slight . . . 6. Diloba.
„ well-developed . . 9. Heliophobus.
15. Tongue short, slight . . . 3. Dasypolia.
„ well-developed . . . . 16.
16. Abdomen more or less crested . . . 17.
„ not crested . . . . 19.
17. Collar forming a prominent rounded hood 1. Cucullia.
„ not forming a rounded hood . . 18.
18. Patagia dilated posteriorly; posterior thoracic crest well marked . . 5. Miselia.
„ not dilated posteriorly; posterior thoracic crest slight . . 2. Polia.
19. Abdomen rather broadly flattened . 11. Conistra.
„ normal . . . . 10. Orthosia.
20. Middle and posterior tibiae spinose . . 21.
„ „ not spinose . . 24.
21. Anterior tibiae with horny apical hook . 22. Heliothis.
„ „ without apical hook . . 22.
22. Anterior tibiae spinose . . . 20. Agrotis.
„ „ not spinose . . . 23.
23. Abdomen crested . . . 34. Actinotia.
„ not crested . . 21. Triphaena.
24. Face with horny projecting plate . . 25.
„ without horny projecting plate . . 27.
25. Projection quadrangular . . . 24. Nonagria.
„ triangular . . . . 26.

26. Tibiae with appressed scales . . 25. Coenobia.
,, rough-scaled . . . 23. Ochria.
27. Hindwings with vein 8 anastomosing with cell to middle . . . 33. Stilbia.
,, with vein 8 anastomosing near base only . . . . 28.
28. Abdomen more or less crested . . . 29.
,, not crested . . . . 33.
29. Patagia somewhat crested posteriorly . 37. Moma.
,, not crested posteriorly . . . 30.
30. Thorax with well-marked anterior crest 35. Hadena.
,, without anterior crest . . . 31.
31. Posterior tibiae with appressed scales 27. Spodoptera.
,, ,, rough-scaled . . . 32.
32. Ciliations of antennae in ♂ minute, even 38. Acronycta.
,, ,, ,, moderate, fasciculated 36. Metachrostis.
33. Antennae in ♂ bipectinated to apex . 28. Rusina.
,, ,, not bipectinated to apex . . 34.
34. Tibiae with appressed scales . . . 35.
,, rough-scaled . . . . 36.
35. Thorax with anterior crest . . 32. Senta.
,, not crested . . 29. Acosmetia.
36. Tongue short, slight . . . 26. Luperina.
,, well-developed . . . . 37.
37. Palpi short, densely hairy . 39. Arsilonche.
,, moderate or long . . . . 38.
38. Palpi long, terminal joint pointed 30. Amphipyra.
,, moderate, terminal joint obtuse 31. Caradrina.

Sub-Fam. 1. *POLIADES.*

Eyes glabrous, ciliated (furnished with a marginal row of long cilia curving over them).

1. Cucullia, *Schrk.*

Head rough-scaled; eyes glabrous, ciliated. Antennae in ♂ shortly ciliated. Thorax with slight posterior crest, collar much enlarged and forming a prominent rounded hood, sometimes crested in middle. Abdomen more or less crested near base.

A large genus, extending throughout the temperate regions of the northern hemisphere, but most plentiful in Europe. Imago with forewings more elongate than usual; usually imitating dead wood or fungus, the hood serving to conceal the head. Larva rather brightly coloured, feeding exposed on low plants.

1. Forewings with broad dark costal streak . . 2.
„ without such streak . . . 5.
2. Forewings with cilia distinctly toothed . . 3.
„ „ „ slightly waved . 5. *asteris.*
3. Expanse 41 mm. or less, costal streak whitish-sprinkled . . . 8. *lychnitis.*
„ 42 mm. or more, costal streak not whitish-sprinkled . . . 4.
4. Forewings with whitish subdorsal posterior suffusion, cilia more toothed . 7. *verbasci.*
„ without such suffusion, cilia less toothed . . 6. *scrophulariae.*
5. Lines thickly blackish-edged . . 1. *absinthii.*
„ hardly marked . . . . 6.
6. Orbicular and reniform distinct . . 2. *gnaphalii.*
„ „ „ obsolete . . . 7.
7. Forewings with fine dark bars in cilia on veins . . . 3. *chamomillae.*
„ without such bars . . 4. *umbratica.*

1. **C. absinthii**, *L.* 37-40 mm. Forewings pale brown, clouded with whitish; subbasal line blackish-edged on costa; first and second lines irregular, thickly blackish-edged, second obsolete in disc, median blackish on upper half; orbicular and reniform indicated by several black dots; a terminal row of black dots. Hindwings fuscous-whitish; a suffused rather dark fuscous terminal band.

SW. England, Suffolk, Merioneth, E. Ireland, local; C. Europe, NW. Asia; 6, 7. Larva pale yellow-green, dorsally suffused with purple-grey except at incisions; dorsal and subdorsal lines pale green; head and plate of 2 ochreous-grey: on *Artemisia absinthium;* 8, 9.

[*C. artemisiae*, Hufn., has been recorded as British, but apparently on doubtful grounds.]

2. **C. gnaphalii**, *Hb.* 37-40 mm. Forewings fuscous, purple-tinged, partially finely whitish-irrorated; base mixed with light ochreous; veins finely dark fuscous; dorsum slenderly blackish; first and second lines dentate, almost obsolete; orbicular and reniform pale-edged, outlined with dark fuscous; one or two dark fuscous interneural streaks beyond reniform;

a dark fuscous terminal dash above tornus. Hindwings fuscous, darker posteriorly.

Kent, Sussex, scarce and local; C. Europe, NW. Asia; 6. Larva bright green; dorsal stripe broad, purplish-brown, darker-marked; spiracles yellow, placed in purple-reddish marks; head bluish-green: on *Solidago* and *Artemisia;* 8, 9.

3. **C. chamomillae,** *Schiff.* 42-45 mm. Forewings pale ashy-brownish, with obscure paler or whitish interneural streaks posteriorly; veins marked by fine blackish lines; fine black interneural streaks in middle posteriorly and towards tornus; cilia cut by fine dark bars on veins. Hindwings light fuscous, in ♂ whitish-tinged anteriorly.

Britain to Fife, Ireland, local; C. and S. Europe, Asia Minor, Syria; 4, 5. Larva pale yellow-green, with purplish-rosy band on each segment; subdorsal series of oblique olive-green marks; lateral and spiracular lines irregular, olive-green, interrupted; head yellow-green: on *Pyrethrum* and *Anthemis;* 6, 7.

4. **C. umbratica,** *L.* 40-52 mm. Differs from *C. chamomillae* as follows: forewings without dark bars in cilia; hindwings in ♂ more or less wholly, in ♀ anteriorly whitish-suffused.

Britain to Ross, Ireland, common; N., C., and SE. Europe, Asia Minor; 6. Larva ochreous-yellow or grey, with numerous fine irregular raised blackish markings; head black; plate of 2 black-brown: on *Sonchus* and *Lactuca;* 8, 9.

5. **C. asteris,** *Schiff.* 42-45 mm. Forewings pale brown, whitish-sprinkled; costa broadly suffused with reddish-fuscous; a narrow dorsal streak and tornal blotch reddish-fuscous streaked with blackish, blotch including a whitish crescentic mark near anterior edge; orbicular and reniform partly outlined with dark fuscous; cilia slightly waved. Hindwings whitish-fuscous; a fuscous terminal band.

S. England to Hereford and Norfolk, Lancashire, Westmoreland, local; C. Europe, NW. Asia; 6. Larva pale yellow-green or purplish-rosy; dorsal, subdorsal, and spiracular lines yellow, black-edged, subdorsal sometimes greenish; head pale yellow or rosy, black-speckled: on *Solidago* and *Aster;* 8, 9.

6. **C. scrophulariae,** *Cap.* 42-46 mm. Forewings pale ochreous or ochreous-brownish; a rather broad dark fuscous costal streak, suffused with reddish-brown beneath, with two whitish costal dots posteriorly; a reddish-brown gradually dilated dorsal streak from near base, streaked with dark fuscous and on tornus with whitish-ochreous, cut by waved

whitish extremity of second line; a reddish-brown wedge-shaped terminal suffusion above middle; cilia toothed. Hindwings in ♂ whitish, in ♀ whitish-fuscous; a suffused fuscous terminal band.

S. England (except SE.) to Gloucester and Norfolk, local; C. Europe, WC. Asia to N. Persia; 5. Larva blue-whitish, with a yellow band on each segment; dorsal series of black bars alternating with pairs of black spots; spiracular series of yellow spots and black marks; head yellow, black-spotted: on *Scrophularia* (especially *S. nodosa*) and *Verbascum;* 6, 7.

7. **C. verbasci**, *L.* 43-47 mm. Differs from *C. scrophulariae* as follows: forewings with costal streak browner, dorsal streak edged above posteriorly by a whitish suffusion, termen more oblique, cilia more sharply toothed; hindwings in ♂ somewhat more infuscated.

England, E. Ireland, common; C. and S. Europe, Asia Minor; 4, 5. Larva blue-whitish, with a yellow band on each segment; double dorsal series of black bent marks alternating with black spots; spiracular series of yellow spots and black marks; head yellow, black-spotted: on *Verbascum* and *Scrophularia;* 6, 7.

8. **C. lychnitis**, *Ramb.* 38-41 mm. Differs from *C. scrophulariae* as follows: forewings with costal streak more whitish-sprinkled, orbicular and reniform slightly paler, dorsal streak more attenuated anteriorly; hindwings with band broader.

Sussex to Gloucester and Norfolk, local; C. Europe; 6. Larva green-whitish, with pale yellowish band on each segment; dorsal series of curved black bars alternating with rows of four black spots; spiracular series of black spots: on *Verbascum;* 7, 8.

2. POLIA, *O.*

Head rough-scaled; eyes glabrous, ciliated. Antennae in ♂ ciliated, or bipectinated with apex filiform, rarely simple. Thorax with more or less prominent anterior and slight posterior crest. Abdomen more or less crested.

Fairly numerous and widely distributed throughout northern temperate regions. Most of the species are autumnal, and some of them hybernate.

1. Thorax ashy-blackish except collar and sides . 2.
 „ not ashy-blackish . . . 3.
2. Forewings with dorsal half red-brown . 2. *vetusta.*
 „ „ „ „ not red-brown 1. *exoleta.*

3. Forewings whitish-green . . . 13. *aprilina*.
,, not whitish-green . . . 4.
4. Forewings with blackish median dash from base . 5.
,, without blackish basal dash . . 10.
5. Basal dash furcate . . . 8. *ornithopus*.
,, ,, not furcate . . . . 6.
6. Antennae in ♂ pectinated . . 10. *viminalis*.
,, ,, not pectinated . . . 7.
7. Forewings with black central submedian dash . 8.
,, without such dash . . . 9
8. Claviform defined . . . 7. *furcifera*.
,, obsolete . . . 6. *lambda*.
9. Orbicular and reniform connected by claviform 9. *areola*.
,, ,, ,, separate . . 5. *socia*.
10. Antennae in ♂ bipectinated . . 11. *lichenea*.
,, ,, not bipectinated . . . 11.
11. Claviform confluent with orbicular . 12. *protea*.
,, separate or absent . . . 12.
12. Subterminal line edged with yellowish spots . 13.
,, ,, not yellowish-edged . . 14.
13. Hindwings with two darker shades . 15. *flavicincta*.
,, without darker shades 16. *xanthomista*.
14. Second line black-marked opposite claviform 14. *chi*.
,, ,, not black-marked . . . 15.
15. Forewings with dorsal half red-brown . 4. *semibrunnea*.
,, ,, ,, not red-brown 3. *solidaginis*.

1. **P. exoleta**, *L.* 54-60 mm. Thorax ashy-blackish, sides whitish, collar brownish. Forewings whitish-ochreous, rosy-tinged, much suffused and streaked with light fuscous; orbicular transverse, fuscous, reniform ochreous-whitish above, blackish beneath, both edged with a pale dark-margined rim, reniform followed by a blackish suffusion; subterminal line obscurely pale, twice sharply dentate below middle, preceded in middle by a short black dash. Hindwings fuscous, suffused with pale rosy-ochreous basally.

Britain to the Orkneys, Ireland, common; Europe, N. and WC. Asia; 9-4. Larva green; lateral line yellow, surmounted on each segment by a pair of connected white black-circled dots; spiracular red, sometimes interrupted, white-edged beneath, marked with triplets of white black-circled dots: on *Carduus*, *Silene*, *Ononis*, etc.; 5-7.

2. **P. vetusta**, *Hb.* 50-57 mm. Differs from *P. exoleta* as follows: forewings whitish-ochreous, towards costa more

brownish-ochreous, dorsal half suffused irregularly with dark red-brown, orbicular rounder, nearly obsolete, praesubterminal black dash longer.

Britain to the Shetlands, Ireland, common; N., C., and SW. Europe, N. Asia; 9-4. Larva green; dorsal and lateral lines yellow; subdorsal series of white black-circled dots; spiracular orange-yellow, blackish-edged above: on *Rumex*, *Trifolium*, *Carex*, etc.; 5-7.

3. **P. solidaginis**, *Hb.* 40-44 mm. Forewings light brown, somewhat whitish-sprinkled, veins black; base whitish; first and second lines obscurely whitish, dentate, second double except towards costa; orbicular and claviform forming two small obliquely placed whitish rings; reniform large, white, enclosing a narrow-oval fuscous ring; subterminal line white, dentate, preceded by a series of black wedgeshaped marks. Hindwings grey, paler basally, with darker discal spot.

Devon, Hants, Warwick to Ross, local; N. and C. Europe, NW. Asia; 8, 9. Larva dark purplish-brown; dorsal line blue-grey, darker-edged; spiracular broad, pale yellow, finely black-edged above; a black mark on front of 2; head pale brown: on *Vaccinium*; 5, 6.

4. **P. semibrunnea**, *Hw.* 37-42 mm. Abdominal crests strong. Forewings narrow, light brown, dorsal half suffused with dark reddish-brown; oblique orbicular, and reniform obscurely outlined with pale; lines very obscurely pale, dentate; subterminal more distinct, suffusedly edged with reddish-brown, preceded near dorsum by an elongate blackish-fuscous spot. Hindwings light grey, darker terminally.

England to York, rather common; WC. Europe, Austria; 9-4. Larva bright green, irrorated above with yellow-white; dorsal line white; subspiracular yellowish-white; subdorsal and lateral series of irregular whitish marks: on ash; 5-7.

5. **P. socia**, *Rott.* (*petrificata*, F.) 37-42 mm. Forewings light brown, mixed with whitish-ochreous; a slender dark fuscous median dash from base; orbicular and reniform pale, obscure; first and second lines very obscure, pale, dark-edged, dentate; median shade brown, distinct; subterminal pale, dentate, edged with reddish-brown. Hindwings grey.

England, Ireland, local; N. and C. Europe, NW. Asia; 9-4. Larva pale green; dorsal and lateral lines white; head black: on ash, oak, and *Tilia*; 5-7.

6. **P. lambda**, *F.* (*Zinckenii*, Tr.) 37-42 mm. Abdominal crests very slight. Forewings grey, violet-tinged; a dark

brown median dash from base, white-edged above; first and second lines very obscure, partly whitish, dark-edged, waved; median shade brownish; a blackish submedian dash joining first and second lines, white-edged beneath. Hindwings fuscous.

Kent, Middlesex, scarce and local; N. and NC. Europe; 9. Larva on *Myrica;* 5-7.

7. **P. furcifera,** *Hufn.* (*conformis,* F.) 40-44 mm. Abdomen with a strong crest. Forewings grey, violet-tinged; a black median dash from base, white-edged above; first and second lines very obscure; median shade brownish; reniform reddish-tinged, with a black dash beneath it; claviform oval, blackish-edged posteriorly, connected with second line by a black dash; subterminal line obscure, brown-edged anteriorly. Hindwings grey, lighter basally.

Glamorgan, Monmouth, scarce and local; N. and C. Europe, NW. Asia; 8-4. Larva greenish-brown, darker-marked, forming a dorsal series of diamonds; dorsal, subdorsal, lateral, and spiracular lines pale yellow; above subdorsal a series of oblique black streaks: on alder and birch; 5, 6.

8. **P. ornithopus,** *Rott.* (*rhizolitha,* F.) 36-40 mm. Forewings white, irregularly mixed with light grey; costa marked with short black strigulae; a black furcate median dash from base; spots edged with white, claviform posteriorly and reniform beneath outlined with black; lines very indistinct. Hindwings grey, lighter basally.

Britain to Caledonian Canal, Ireland, common; C. and SW. Europe; 9-4. Larva pale blue-green; dorsal and subdorsal lines white, edged with dark green; spiracular yellow-whitish, indistinct: on oak; 5-7.

9. **P. areola,** *Esp.* (*lithorhiza,* Bkh.) 31-35 mm. Forewings brown, much mixed and suffused with white, sometimes rosy-tinged; a black median dash from base; first and second lines obscurely pale, waved, internally blackish-edged; claviform oval, confluent with both orbicular and reniform, all edged with pale and outlined with blackish; subterminal line pale, dentate, followed by a series of short black dashes in brown spots. Hindwings light grey.

Britain to Ross, Ireland, common, scarcer northwards; W. Europe, Asia Minor; 3, 4. Larva pale greyish-ochreous; dorsal line paler, double; darker brown dorsal blotches on 8 and 9; 12 with small prominence: on *Lonicera;* 6-8.

10. **P. viminalis,** *F.* 27-30 mm. Antennae in ♂ bipectinated.

Forewings fuscous, sometimes much suffused with whitish; a black median dash from base, edged above with ochreous-whitish; subbasal line whitish, followed by a black mark in disc; orbicular and reniform subquadrate, edged with whitish, partly outlined with black; first and second lines obscure, sometimes connected by a black dash below middle; subterminal whitish. Hindwings grey, lighter anteriorly.

Britain to the Orkneys, Ireland, common; N. and C. Europe, NW. Asia; 7. Larva whitish-green; dorsal, subdorsal, and spiracular lines white, indistinct: on willow (*Salix*); 5, 6.

11. **P. lichenea,** *Hb.* 33-36 mm. Antennae in ♂ bipectinated. Forewings light greenish-grey; subbasal line partly blackish-edged; first and second obscurely pale, internally black-edged; second followed by a whitish or ochreous suffusion; orbicular and reniform edged with whitish or ochreous, partly outlined with black; claviform small, roundish, black-edged; subterminal line whitish or pale ochreous, preceded by dark spots. Hindwings in ♂ white, in ♀ grey-whitish, with two grey posterior lines; a grey discal dot.

W. England to Lancashire, Kent, Sussex, York, E. Ireland, local; WC. and SW. Europe; 8, 9. Larva pale dull green or brownish, reticulated with darker; spiracular line pale green; head yellowish or yellow-brown: on *Scabiosa*, *Senecio*, *Rumex*, etc.; 11-5.

12. **P. protea,** *Bkh.* 32-35 mm. Forewings light brown, mixed with olive-green and whitish; lines obscure, partly blackish-edged; orbicular and reniform edged with whitish, claviform represented by an irregular whitish blotch confluent with orbicular, edged by a black dash beneath; subterminal line whitish, twice dentate below middle, partly blackish-edged posteriorly. Hindwings whitish-grey, with dark grey subterminal suffusion; discal mark outlined with grey.

Britain to Ross, E. Ireland, common; C. and SW. Europe; 9. Larva pale greyish-ochreous or greenish; dorsal line pale yellowish, sometimes edged with dark fuscous; spiracular brownish or yellowish; head brownish: on oak; 4-6.

13. **P. aprilina,** *L.* 40-48 mm. Collar edged with black posteriorly. Forewings whitish-green; lines white, waved, subbasal edged with strong black marks, first and second strongly black-edged internally, subterminal posteriorly: median line black; orbicular and reniform edged with white and outlined with black, placed on a black bar reaching second line; claviform subquadrate, whitish, black-edged, placed above

a similar bar. Hindwings grey, discal spot and subterminal suffusion darker.

Britain to Ross, N. and E. Ireland, common; C. Europe; 9, 10. Larva pale greenish-ochreous, freckled with black. forming dorsal series of diamonds; dorsal line pale, interrupted, black-edged; spiracular pale, blackish-edged above: on oak; 4-6. The larva rests by day on the oak-trunks, whose colouring it mimics.

14. **P. chi**, *L.* 31-37 mm. Forewings white sprinkled with pale brownish; lines waved-dentate, edged with light brownish; orbicular and reniform outlined with brownish; claviform semi-oval, posteriorly outlined with black, more or less connected with a black mark on anterior edge of second line; sometimes some black wedge-shaped marks before subterminal line. Hindwings in ♂ white; in ♀ fuscous-whitish, with two posterior fuscous shades.

Britain to Sutherland, Ireland, common, scarce in south; N. and C. Europe, NW. Asia; 7-9. Larva pale green; dorsal and subdorsal lines whitish; spiracular broad, white, edged above with suffused dark green: on hawthorn, *Rumex*, *Sonchus*, etc.; 4, 5.

15. **P. flavicincta**, *F.* 37-44 mm. Forewings very pale greyish-ochreous, mixed with grey and whitish, and irregularly marked with pale orange, especially on edges of spots and subterminal line; spots and lines obscurely margined with grey, median shade grey. Hindwings grey-whitish, postmedian and subterminal shades grey.

England, E. Ireland, common; C. (except EC.) and SW. Europe; 8, 9. Larva pale green; dorsal line darker; spiracular white, sometimes black-edged above: on birch, *Rumex*, *Stellaria*, etc.; 5-7.

16. **P. xanthomista**, *Hb.* (*nigrocincta*, Tr.) 36-40 mm. Forewings pale grey, mixed with blackish and whitish, median area suffusedly darker; a short median basal streak, vein 1 b, edges of spots and subterminal line marked with orange-yellow. Hindwings in ♂ white, in ♀ uniform rather dark grey.

Cornwall, Devon, Isle of Man, local; C. (except EC.) Europe; 8, 9. Larva brownish-ochreous, posteriorly orange-tinged; dorsal and spiracular lines pale; head pale brown: on *Silene*, *Statice*, *Plantago*, etc.; 6, 7.

3. DASYPOLIA, *Gn.*

Head densely rough-haired; eyes glabrous, ciliated. Tongue short, slight. Antennae in ♂ ciliated. Thorax densely hairy, without distinct crest. Abdomen not crested. Tarsi shortly rough-haired.

Restricted to the single species; it is probably correlated to the preceding genus.

1. **D. templi**, *Thnb.* 41-46 mm. Forewings pale ochreous, mixed with brownish and dark fuscous; subbasal, first, and second lines waved-dentate, rather dark fuscous; orbicular and reniform small, pale; subterminal line pale, darker-edged anteriorly. Hindwings pale ochreous, fuscous-sprinkled, with two posterior fuscous shades.

Britain to the Shetlands, E. Ireland, local, commoner northwards; N. and mountains of C. Europe; 10-3. Larva pinkish-ochreous, dotted with blackish; head yellowish-brown: in roots of *Heracleum*; 5-8.

4. VALERIA, *Germ.*

Head rough-scaled; eyes glabrous, ciliated. Antennae in ♂ bipectinated to apex. Thorax with small anterior and posterior crests. Abdomen with several crests.

There is a second European species, but the genus has not been identified elsewhere.

1. **V. oleagina**, *F.* 40-42 mm. Forewings fuscous, veins more or less broadly suffused with dull green; subbasal, first, and second lines partly blackish; orbicular edged with white, reniform wholly white; subterminal line whitish-marked. Hindwings whitish, with fuscous postmedian line and terminal suffusion.

Pembroke, not since ninety years ago, perhaps now extinct; C. Europe; 3-4. Larva with 2-4 swollen; ochreous, much marked with brown; 2 anteriorly yellow-ochreous, with a series of dark fuscous dots; spiracular line yellow-ochreous after 4; head brown: on blackthorn; 5, 6.

5. MISELIA, *O.*

Head rough-scaled, tufted; eyes glabrous, ciliated. Antennae in ♂ dentate, ciliated. Thorax with slight anterior and double posterior crests, patagia dilated towards tips. Abdomen with several crests.

Only the two following species are known; the genus is correlated with *Polia*.

Forewings with veins suffused with green 1. *oxyacanthae.*
,, ,, not green . . 2. *bimaculosa.*

1. **M. oxyacanthae**, *L.* 36-42 mm. Forewings rather light brown, veins and dorsum suffused with brassy-green, interrupted before subterminal line; a black median dash from base passing first line; first and second lines black, second followed by a white crescent near dorsum; spots rather pale, roundish, finely and indistinctly blackish-edged, reniform large; subterminal line whitish-dotted, preceded by dark fuscous dots. Hindwings fuscous, with darker angulated postmedian line.

Britain to Ross, Ireland, common; C. Europe, Asia Minor; 9, 10. Larva fuscous, darker-marked, dots pale; dorsal and subdorsal lines indistinctly pale; 12 somewhat raised, with four small tubercles; head brown: on hawthorn and blackthorn; 4-6.

2. **M. bimaculosa**, *L.* 48-54 mm. Forewings pale brown much mixed with white, veins partly black-marked; lines waved-dentate, brown-edged; spots roundish, brown-edged, reniform large, partly suffused with white, edged beneath by a black dash; a brown suffusion on fold above tornus. Hindwings whitish-fuscous; discal spot rather large, fuscous; a fuscous subterminal suffusion, forming a darker spot above tornus.

Gloucester, once eighty years ago, perhaps now extinct; C. Europe; 8, 9. Larva brown, darker anteriorly, dots pale; spiracular line pale, dark-edged above; 12 with two tubercles: on elm; 5-6.

6. Diloba, *B.*

Head rough-haired; eyes glabrous, ciliated. Tongue short, slight. Antennae in ♂ bipectinated to apex. Thorax with slight posterior crest. Abdomen not crested.

The single species is of somewhat peculiar facies, but undoubtedly referable here.

1. **D. caeruleocephala**, *L.* 32-37 mm. Forewings fuscous, basal and praesubterminal spaces browner; a short black median dash from base; first and second lines black; spots broadly edged with bluish-white, orbicular and claviform circular, confluent; subterminal line pale, terminal space often irrorated with whitish. Hindwings fuscous-whitish; discal spot and postmedian line grey; a suffused black tornal mark.

Britain to the Clyde, Ireland, common; Europe, Asia Minor; 9. Larva blue-grey; dorsal line yellow, interrupted; spiracular yellow; tubercular dots black: on hawthorn and blackthorn; 4-6.

7. Asteroscopus, *B.*

Head rough-scaled; eyes glabrous, ciliated. Tongue short, slight. Antennae in ♂ bipectinated to apex. Palpi densely hairy throughout. Thorax without distinct crest. Abdomen not crested. Anterior tibiae with strong horny apical hook.

Besides the following, a species from NE. Asia has been referred to this genus.

First and second lines distinct . . 1. *nubeculosus.*
„ „ obsolete . . . 2. *sphinx.*

1. **A. nubeculosus**, *Esp.* 40-45 mm. Forewings pale brownish mixed with whitish and much sprinkled with black; veins marked with blackish; first, median, and second lines dark fuscous; reniform whitish, black-edged, enclosing two dark marks; claviform, oval, black-edged. Hindwings whitish-fuscous, with dark fuscous discal spot and terminal dots.

Perth, local; C. Europe; 3, 4. Larva pale yellow-green deeper laterally; tubercular dots pale yellow; an oblique lateral streak on 4, and transverse streak on 12 yellow; legs more or less red: on birch; 5, 6. The larva habitually rests with the anterior segments strongly thrown back over the body, and the legs outspread.

2. **A. sphinx**, *Hufn.* (*cassinea*, Hb) 37-40 mm. Forewings whitish-ochreous, suffused with whitish and mixed with pale brownish; veins partly black posteriorly; a rather long black median dash from base; lines fuscous on costa; subterminal dentate, whitish, edged by blackish interneural dashes. Hindwings whitish, partly fuscous-sprinkled; a round fuscous discal spot.

England, rather common; C. Europe; 10, 11. Larva pale green; dorsal and subdorsal lines whitish, latter commencing on 5; spiracular yellow-whitish, brown-edged above; 12 with slight prominence: on oak, elm, hawthorn, etc.; 5, 6.

8. Aporophyla, *Gn.*

Face with rounded horny prominence; eyes glabrous, ciliated. Antennae in ♂ bipectinated or dentate, towards apex simple. Thorax with slight anterior and posterior crests. Abdomen not crested.

Only one other European species is known.

1. Forewings with black median basal dash . 1. *australis.*
„ without black basal dash . . 2.
2. Forewings with veins pale . . 4. *lunosa.*
„ „ not pale . . . 3.
3. Posterior edge of reniform whitish-ochreous 3. *nigra.*
„ „ „ not whitish-ochreous 2. *lutulenta.*

1. **A. australis**, *B.* 35-38 mm. Forewings light brown, more or less suffused with whitish, darker along costa, veins dark fuscous posteriorly; a black median dash from base; first and second lines fine, black, acutely dentate; spots finely outlined with black, sometimes obscure, reniform with a dark spot on lower end; a subterminal series of dark fuscous interneural marks, sometimes reaching termen. Hindwings in ♂ white, in ♀ fuscous.

Kent to Devon, Norfolk, SE. Ireland, local; S. Europe; 8, 9. Larva yellow-green, dorsally reddish-suffused; dorsal line pale reddish, marked with black V-shaped spots; subdorsal series of black marks; spiracular pale yellowish; head greenish, brown-speckled: on grasses and *Cichorium;* 10-4.

2. **A. lutulenta**, *Bkh.* 37-40 mm. Forewings rather dark fuscous, discal area darker; first and second lines and margins of spots finely darker, very obscure; subterminal line obscurely darker-edged anteriorly. Hindwings in ♂ white, in ♀ fuscous.

Britain to the Orkneys, W. Ireland, local; C. Europe; 9. Larva pale green; 2-4 dorsally rosy-suffused; dorsal and subdorsal lines brownish, interrupted, commencing on 5; spiracular white, crimson-edged above: on *Myosotis*, *Lithospermum*, *Achillea*, etc.; 10-4.

3. **A. nigra**, *Hw.* 39-42 mm. Forewings dark fuscous, costa, median area, and termen darker; first and second lines fine, blackish, obscure, waved-dentate; spots indistinctly margined with blackish, posterior edge of reniform whitish-ochreous; three or four whitish-ochreous dots on costa posteriorly. Hindwings whitish, in ♀ more or less suffused with fuscous.

Britain to Ross, Ireland (except S.), rather common; C. and S. Europe; 9, 10. Larva green, yellow-brown, yellow, or dull crimson; 2-4 often suffused with red; dorsal and subdorsal lines usually darker, often interrupted; spiracular pale yellowish; spiracles white, in black marks on 5-7: on *Rumex*, *Plantago*, *Galium*, etc.; 10-5.

4. **A. lunosa**, *Hw.* 31-34 mm. Forewings brown, veins ochreous-whitish; costal edge whitish-yellowish; lines fine, whitish, subterminal edged anteriorly with small black spots or dots; median shade dark fuscous; orbicular and reniform dark brown, edged with ochreous-whitish. Hindwings whitish; a grey crescentic discal spot; a grey subterminal suffusion, sometimes reduced to two or three spots.

Britain to the Clyde, Ireland, rather common; France, Spain; 9. Larva yellow-brown or green; dorsal and subdorsal lines pale or whitish; spiracular whitish, brown-edged above; tubercular spots large, black: on grasses; 10-4.

9. HELIOPHOBUS, *B.*

Head rough-scaled; eyes glabrous, ciliated. Antennae in ♂ bipectinated to apex. Thorax with small posterior crest. Abdomen not crested.

Restricted to the single species.

1. **H. hispidus,** *H-G.* 31-34 mm. Forewings brown, veins in disc white, posteriorly whitish-edged; subbasal, first, and second lines white, black-edged, median black, subterminal even, white; orbicular and reniform pale ochreous, edged with whitish and outlined with black; claviform outlined with black. Hindwings in ♂ whitish, in ♀ pale grey; discal mark, postmedian line, and terminal suffusion grey.

Hants and Devon to Northampton and Warwick, local; France, W. Spain; 9. Larva yellow-green or brownish; dorsal and subdorsal lines pale, darker-edged; spiracular broad, yellowish-white; tubercular dots black: on grasses; 10-4.

10. ORTHOSIA, *O.*

Head rough-scaled; eyes glabrous, ciliated. Antennae in ♂ ciliated. Thorax with or without anterior crest. Abdomen not crested.

A considerable genus of nearly universal distribution, though mainly found in temperate regions of both hemispheres. The imagos are almost all autumnal, and their yellow and ferruginous colouring is doubtless adapted to the autumn tints of falling leaves.

1. Forewings yellow or orange . . . . 2.
„ ochreous, brown, or grey . . . 7.
4. Collar fuscous-purplish . . . 5. *flavago.*
„ yellow or orange . . . . . 3.
3. Hindwings with grey discal spot and line. 2. *croceago.*
„ without grey discal markings . . 4.
4. Forewings with median space dorsally purplish-fuscous . . 1. *xerampelina.*
„ „ „ not purplish-fuscous . 5.
5. Thorax with purple dorsal streak . . 3. *citrago.*
„ without purple dorsal streak . . 6.
6. Hindwings with purplish subterminal suffusion 4. *aurago.*
„ without purplish subterminal suffusion 6. *fulvago.*

7. Hindwings whitish . . . . . 8.
„ grey . . . . . 9.
8. Hindwings ochreous-tinged . . 7. *gilvago.*
„ not ochreous-tinged . . 8. *ocellaris.*
9. Forewings with subterminal line nearly straight . 10.
„ „ „ not nearly straight 11.
10. Forewings ochreous . . . 13. *macilenta.*
„ grey . . . . 14. *lota.*
11. Hindwings with termen pale reddish-ochreous 10. *helvola.*
„ „ grey . . . 12.
12. Forewings with black costal subterminal mark 11. *litura.*
„ without such mark . . . 13.
13. Orbicular very narrow, oblique . . 12. *pistacina.*
„ not narrow . . . . 14.
14. Reniform forming a spot and two dots . 17. *satellitia.*
„ normal . . . . . 15.
15. Forewings ochreous . . . 9. *circellaris.*
„ brown or grey . . . . 16.
16. Subterminal line whitish . . . 15. *ypsilon.*
„ „ hardly paler . . 16. *suspecta.*

1. **O. xerampelina**, *Hb.* 31-35 mm. Forewings orange-yellow; first and second lines even, pale, lower $\frac{2}{3}$ of median space and an oblong projection from it between obsolete orbicular and reniform light purplish-fuscous; a light purplish-fuscous terminal fascia, not reaching costa. Hindwings ochreous-whitish, more ochreous-tinged posteriorly.

Britain to Perth, N. and E. Ireland, rather local; C. (except EC.) Europe; 9. Larva brown-grey, darker-freckled; dorsal line pale, irregular, darker-edged; subdorsal and spiracular pale, dark-edged above: on ash; 10-6. The larva rests in the crevices of the bark, which it resembles in colour.

2. **O. croceago**, *F.* 31-35 mm. Palpi long. Forewings orange, mixed with ferruginous; subbasal, first, and second lines edged with grey dots sprinkled with black; median and subterminal lines grey sprinkled with black, median angulated in middle; orbicular and reniform paler-edged. Hindwings yellowish-white, slightly rosy-tinged; discal spot and irregular postmedian line grey.

Kent and Devon to Worcester, Leicester, York, E. Ireland, local; C. and SW. Europe; 9-4. Larva pale orange-ochreous, darker-freckled; brown dorsal V-shaped marks on 5-12; dorsal and subdorsal lines paler, darker-edged: on oak; 5, 6.

3. **O. citrago**, *L.* 33-35 mm. Thorax with a purple dorsal

streak. Forewings yellow, sprinkled with ferruginous; veins ferruginous; subbasal, first, median, and second lines ferruginous, with a few blackish scales; orbicular and reniform outlined with ferruginous; subterminal line pale, obscurely ferruginous-edged anteriorly. Hindwings yellow-whitish.

England, Roxburgh, the Hebrides, E. Ireland, not uncommon; N. and C. Europe; 8, 9. Larva brown-grey or pinkish-brown; dorsal and subdorsal lines pale, latter edged above with blackish marks; spiracular area grey-whitish, edged above with black marks: on lime (*Tilia*); 5, 6.

4. **O. aurago,** *F.* 31-35 mm. Forewings orange-yellow; basal, praesubterminal, and terminal spaces light purplish; median line ill-marked, ferruginous; orbicular and reniform more or less marked with purple and ferruginous. Hindwings light yellowish, darker terminally; a subterminal purplish suffusion.

England to York, local; C. Europe; 9, 10. Larva brownish; dorsal, subdorsal, and spiracular lines pale greyish-ochreous; tubercular dots pale; head ochreous: on beech; 5, 6.

5. **O. flavago,** *F.* (*silago*, Hb.) 30-35 mm. Thorax yellow, collar fuscous-purplish. Forewings deep yellow; some purplish dots anteriorly; a greyish-purple costal blotch towards base; median shade greyish-purple, interrupted, followed by a purplish suffusion on lower half; second line edged with greyish-purple, followed by a greyish-purple costal blotch; subterminal indicated by a row of dark grey dots. Hindwings yellow-whitish, sometimes dorsally greyish-tinged; a faint grey postmedian line.

Britain to Caledonian Canal, N. and E. Ireland, common; C. Europe, WC. and N. Asia; 9, 10. Larva dull pinkish-ochreous, brown-freckled; dorsal line pale, indistinct, darker-edged; spiracular pale, rather broad; plate of 2 dark brown, with three pale lines: in catkins (and on leaves) of *Salix caprea;* 4-6.

6. **O. fulvago,** *L.* (*cerago*, F.) 33-37 mm. Forewings pale yellow; median line and margins of first and second lines variably marked with purplish-fuscous and suffused with light ferruginous, forming blotches towards costa; orbicular and reniform outlined with ferruginous and brown, lower end of reniform grey; subterminal line indicated by two series of dots, first blackish, second pale ferruginous. Hindwings ochreous-white.

Britain to Caledonian Canal, N. and E. Ireland, common; N. and C. Europe, N. Asia; 8, 9. Larva pinkish-brown, darker-freckled; dorsal line paler, dark-edged; plate of 2 dark brown, with three pale lines: in catkins (and on leaves) of *Salix caprea;* 4-6.

7. **O. gilvago,** *Esp.* 31-36 mm. Forewings yellow-ochreous, brownish-tinged; median line and margins of first and second lines marked with blackish-grey and suffused with red-brownish, somewhat blotched towards costa; orbicular and reniform outlined with brown and blackish-grey; subterminal line edged with blackish-grey dots. Hindwings ochreous-whitish, more ochreous posteriorly.

England to York, local; C. Europe; 8, 9. Larva pinkish-brown; dorsal line paler, traversing a series of dark brown V-shaped marks; subdorsal pale, partly blackish-edged above; spiracular pale; posterior dorsal dots of each segment inside the dark mark: on seeds of elm; 5, 6.

8. **O. ocellaris,** *Bkh.* 32-37 mm. Forewings dull reddish-ochreous, more or less sprinkled with grey and whitish-ochreous, sometimes mixed with yellowish or brown-reddish; veins pale; first and second lines pale, dark-margined, median grey, subterminal edged with blackish-grey dots; orbicular and reniform edged with yellow-whitish, dark-outlined, lower end of reniform marked with a white dot edged with dark grey. Hindwings whitish, dorsally fuscous-tinged.

Kent, Surrey, scarce; WC. and S. Europe, WC. Asia; 9, 10. Larva in buds (and on leaves) of poplar; 4-6.

9. **O. circellaris,** *Hufn.* (*ferruginea,* Esp.) 34-39 mm. Forewings ochreous sprinkled with brown-reddish; subbasal, first, and second lines reddish-fuscous; median shade dark brown-red; orbicular and reniform outlined with dark brown-red, lower end of reniform mixed with black and whitish; subterminal line pale, edged anteriorly with dark brown-red, and preceded and followed by faint fuscous shades. Hindwings grey, darker terminally, costa broadly whitish-ochreous.

Britain to the Shetlands, Ireland, common; C. Europe; 9, 10. Larva brown or ochreous-brown; dorsal line paler, traversing a series of dark brown V-shaped marks; subdorsal pale, partly black-edged above; spiracular pale; posterior dorsal dots of each segment outside the dark mark: on seeds and buds of elm, poplar, and *Salix;* 4-6.

10. **O. helvola,** *L.* (*rufina,* L.) 32-37 mm. Forewings greyish-ochreous, mixed or wholly suffused with brown-red, with darker bands before first and beyond second line; lines obscurely pale; median shade dark brown-red; orbicular and

reniform obscurely pale or pale-edged. Hindwings grey, costa and termen whitish-ochreous suffused with pale reddish.

Britain to Ross, Ireland, rather common; N. and C. Europe, Asia Minor, NW. Asia; 9, 10. Larva brown, brownish-green, or ochreous-reddish; dorsal line whitish, indistinct; spiracular broad, white: on oak, elm, hazel, etc.; 4-6.

11. **O. litura**, *L.* 32-37 mm. Forewings light fuscous, sprinkled or partly suffused with brown, slightly reddish-tinged; five more or less distinct black costal marks on origin of lines; subbasal, first, and second lines obscurely darker-edged; median shade dark brown; orbicular and reniform finely outlined with pale, reniform fuscous. Hindwings fuscous, darker terminally.

Britain to Ross, Ireland, rather common; Europe; 9, 10. Larva dull yellowish-green, darker-freckled; dorsal and subdorsal lines pale, indistinct, darker-edged; spiracular whitish-yellow, blackish-edged above; head brownish-tinged: on bramble (*Rubus*), *Salix*, *Rumex*, etc.; 4-6.

12. **O. pistacina**, *F.* 33-38 mm. Forewings ochreous or reddish-ochreous, sometimes brownish-tinged, veins sometimes paler; first and second lines faintly dark-edged, sometimes marked with black dots on costa; orbicular and reniform darker or partly blackish, obscurely pale-edged, orbicular very narrow, oblique; subterminal line sometimes preceded by black dots. Hindwings grey.

England to York, Ireland, common; C. and S. Europe, Asia Minor; 9, 10. Larva green or brown, darker-freckled; dorsal line slender, whitish; spiracular broad, whitish: on grasses, *Carex*, *Ranunculus*, etc.; 4-6.

13. **O. macilenta**, *Hb.* 31-35 mm. Forewings ochreous or reddish-ochreous; subbasal, first, and second lines indicated by black dots; median shade indistinctly fuscous; orbicular and reniform faintly outlined with darker, lower end of reniform usually blackish; subterminal line almost straight, broken near costa, pale, edged anteriorly with brown or red-brown. Hindwings grey, discal spot and postmedian line obscurely darker.

Britain to Ross, Ireland, common; C. Europe; 9, 10. Larva ochreous-brown, darker-freckled; dorsal line whitish, distinct; subdorsal pale or whitish; spiracular ochreous-whitish or white, dark-edged above: on beech, oak, and hawthorn; 4-6.

14. **O. lota**, *Cl.* 32-36 mm. Forewings grey, sometimes

reddish-tinged; subbasal, first, and second lines indicated by black dots; median shade darker grey; orbicular and reniform edged with whitish and outlined with brown-red, lower end of reniform blackish; subterminal line nearly straight, broken near costa, grey-whitish, edged anteriorly with brown-red. Hindwings grey, darker terminally.

Britain to Caledonian Canal, Ireland, common; C. and SW. Europe, Asia Minor, NW. Asia; 9, 10. Larva brown, sometimes purplish or reddish-tinged; dorsal and subdorsal lines white, interrupted, dark-edged; spiracular broad, ochreous-whitish; tubercular dots white: on *Salix fragilis*, etc.; 5-6.

15. **O. ypsilon**, *Bkh.* (*fissipuncta*, Hw.) 33-35 mm. Forewings brown more or less mixed with dark fuscous, slightly purplish-tinged; subbasal, first, and second lines obscurely pale, darker-edged; median shade darker fuscous; orbicular and reniform outlined with whitish, connected beneath; claviform outlined with darker; subterminal line whitish. Hindwings pale grey, darker posteriorly.

Britain to Caledonian Canal, E. Ireland, rather local; C. Europe, WC. and NW. Asia; 7. Larva brown, sometimes reddish-tinged, blackish-marked; dorsal line pale; subdorsal pale, interrupted; spiracular pale, dark-edged above: on *Salix* and poplar; 5.

16. **O. suspecta**, *Hb.* 28-32 mm. Forewings grey, more or less tinged with violet-reddish; first line darker, blackish-sprinkled, second indicated by black dots; median shade darker; orbicular and reniform outlined with whitish, lower end of reniform somewhat darker; subterminal line faintly paler. Hindwings grey, darker terminally.

Britain to Ross, local, scarce southwards; C. Europe, N. and WC. Asia; 7. Larva purplish-brown; dorsal line almost white; subdorsal series of blackish marks; faint lateral series of whitish freckles; subspiracular pale, greenish-tinged; head yellow-brown, black-marked: on birch and poplar; 5.

17. **O. satellitia**, *L.* 38-45 mm. Forewings reddish-ochreous-brown, somewhat purplish-shining; subbasal, first, and second lines dark brown, first straight; median shade brown; reniform orange or clear white, forming a semi-oval spot with a dot at upper and lower extremity; subterminal line obscurely pale. Hindwings grey.

Britain to Ross, Ireland, common; N. and C. Europe, NW. Asia; 10-3. Larva dark brown; dorsal and subdorsal lines sometimes somewhat paler; spiracular whitish, often reduced to white spots on 2, 3, 6, and 12; head ochreous-brown: on oak, beech, etc., but often habitually carnivorous, feeding on other larvae of *Lepidoptera;* 5, 6.

11. CONISTRA, *Hb.*

Head rough-haired; eyes glabrous, ciliated. Antennae in ♂ ciliated. Palpi hairy throughout. Thorax with slight anterior crest. Abdomen broad, rather flattened, not crested.

A small genus of closely allied species, inhabiting temperate regions of the northern hemisphere; it is correlated with the preceding. The imagos appear in late autumn and hybernate.

1. Forewings with numerous series of blackish dots . . . 1. *rubiginea.*
,, without such series . . . . 2.
2. Reniform with three black dots beneath . . . 2. *erythrocephala.*
,, without separate black dots . . 3.
3. Forewings dark brown, apex quadrate . 3. *ligula.*
,, reddish-ochreous, apex obtuse 4. *vaccinii.*

1. **C. rubiginea**, *F.* 33-36 mm. Forewings ferruginous-yellowish or ferruginous-ochreous, sometimes partly tinged with ferruginous-brown; subbasal, first, second, and subterminal lines edged with blackish dots, and two or three additional series of blackish dots; orbicular and reniform faintly outlined with pale, lower end of reniform blackish. Hindwings rather dark fuscous.

England to York, E. and S. Ireland, local and uncommon; N. and C. Europe; 10-3. Larva purplish-brown, clothed with golden-brown hairs; dorsal, subdorsal, and spiracular lines obscurely paler, surrounded by blackish freckles; a dorsal series of blackish spots: on *Taraxacum*, *Rumex*, apple, etc.; 5, 6. The colouring of the imago is very suggestive of a faded elm-leaf.

2. **C. erythrocephala**, *F.* 35-39 mm. Head light reddish-ochreous. Forewings greyish-ochreous, more or less mixed or suffused with light red-brown; subbasal, first, second, and subterminal lines paler, darker-edged; orbicular and reniform paler-edged, lower end of reniform marked with two or three black dots; a reddish-brown costal praesubterminal spot. Hindwings fuscous, darker terminally.

Kent to Devon, local and rare; C. Europe; 10-3. Larva fuscous; spiracular line whitish: on *Galium*, *Plantago*, etc.; 5.

3. **C. ligula**, *Esp.* (*spadicea*, Hw., *nec* Hb.) 29-32 mm. Forewings with apex quadrate; dark ferruginous-brown, some-

times thinly sprinkled with grey-whitish; first and second lines paler, darker-edged, almost obsolete; orbicular and reniform seldom pale-edged, outlined with dark red-brown, lower end of reniform often blackish-grey; subterminal line obsoletely paler, seldom light reddish-ochreous. Hindwings rather dark grey.

England, common; C. and SW. Europe; 10-3. Larva yellowish-brown; dorsal line pale, indistinct; spiracular light pinkish-ochreous, darker-edged above; head reddish-brown: on *Lonicera*, hawthorn, etc.; 5, 6.

4. **C. vaccinii**, *L.* 29-32 mm. Forewings somewhat broader than in *C. ligula*, apex distinctly obtuse; ochreous, more or less mixed or suffused with brown reddish, sometimes fuscous-tinged; lines more or less strongly darker-edged, median shade darker, subterminal preceded by blackish dots; orbicular and reniform pale-edged, lower end of reniform fuscous-purple mixed with blackish. Hindwings fuscous, with a darker subterminal suffusion.

Britain to Ross, Ireland, very common; N. and C. Europe, Asia Minor, NW. Asia; 10-3. Larva pinkish-brown; dorsal and subdorsal lines paler, indistinct; subspiracular pale, greenish-tinged; head brown, darker-marked: on elm, oak, *Salix*, etc.; 5, 6.

Sub-Fam. 2. *MELANCHRIDES.*

Eyes hairy.

12. Meliana, *Curt.*

Head loosely scaled; eyes hairy. Antennae in ♂ ciliated. Thorax without crest. Abdomen elongate, not crested. Tibiae with appressed scales.

Only contains a single species; like many other reed-frequenting insects, it is protectively coloured in imitation of dead reeds.

1. **M. flammea**, *Curt.* 33-36 mm. Forewings whitish-ochreous, partly suffused with whitish, with a few dark fuscous scales; fine interneural lines and margins of veins fuscous; a more or less marked central longitudinal brownish suffused streak, edged above with whitish suffusion; second line indicated by a few dark dots. Hindwings whitish, ochreous-tinged.

Suffolk and Norfolk to Hunts, local, in fens; C. Europe; 6. Larva rather light brown; dorsal line pale, dark-edged; subdorsal, triple lateral, and supraspiracular pale; subspiracular pale greyish-ochreous; head darker-reticulated: on reed

(*Phragmites*); 8, 9. The larva hides itself by day in the old reed-stems.

13. Leucania, *O.*

Head rough-scaled; eyes hairy. Antennae in ♂ ciliated. Thorax with or without slight anterior crest. Abdomen not crested.

A very large cosmopolitan genus, equally common everywhere; it is a development of *Melanchra*, to which some of the New Zealand species give such a complete transition that a line of demarcation can hardly be drawn. The larvae all feed on *Gramineae*.

1. First and second lines dark, entire . . 2.
,, ,, ,, dotted or absent . 4.
2. Hindwings brassy-whitish . . 7. *vitellina.*
,, not whitish . . . . . . 3.
3. First line sharply angulated below middle 6. *conigera.*
,, ,, not angulated below middle . 1. *turca.*
4. Forewings with black median basal dash . 5.
,, without black basal dash . . 7.
5. Reniform forming a clear white dot . . 6.
,, not forming a white dot . 8. *comma.*
6. Hindwings wholly white . . 4. *Loreyi.*
,, with termen fuscous . 9. *putrescens.*
7. Forewings with white median streak throughout 5. *littoralis.*
,, without such streak . . 8.
8. Second line indicated by dots . . . 9.
,, ,, wholly absent . . 12. *impudens.*
9. Second line indicated by a series of dots . 10.
,, ,, ,, by two dots only . . 13.
10. Forewings with distinct oblique apical fuscous dash . . . 11. *unipuncta.*
,, without such dash . . . 11.
11. Veins whitish, outlined with fuscous . 10. *obsoleta.*
,, not outlined with fuscous . . 12.
12. Reniform curved-linear . . . 2. *lithargyrea.*
,, dot-like . . . 3. *albipuncta.*
13. Hindwings with postmedian series of black marks 13. *straminea.*
,, without such series . . . 14.
14. Hindwings dark grey . . . 14. *impura.*
,, white . . . 15. *pallens.*

1. **L. turca**, *L.* 40-45 mm. Posterior tibiae in ♂ with very dense large tuft of dull reddish scales. Forewings brownish-ochreous, suffusedly strigulated with red-brown; first and second lines dark fuscous; reniform linear, whitish, edged posteriorly with dark fuscous. Hindwings grey, more or less tinged with dull crimson.

Britain to the Clyde, local, in woods; C. Europe; 6, 7. Larva ochreous-yellow, freckled with dark grey and purplish, anteriorly purplish-suffused; dorsal and subdorsal lines pale ochreous, subdorsal dark-edged; a dorsal series of dark grey marks; head brown: on grasses; 8-5.

2. **L. lithargyrea**, *Esp.* 35-39 mm. Abdomen in ♂ beneath with large basal tuft of black hairs. Forewings pale greyish-ochreous suffused with light reddish-ochreous, with a few black scales; first and second lines indicated by series of black dots; reniform curved-linear, obscurely whitish, lower end clear white. Hindwings grey, terminally darker.

Britain to Ross, Ireland, common; Europe, Asia Minor, Syria; 6, 7. Larva pinkish-ochreous; dorsal line white, blackish-edged; subdorsal whitish, edged above with dark fuscous; supraspiracular sometimes paler: on grasses; 9-5.

3. **L. albipuncta**, *F.* 29-34 mm. Abdomen in ♂ beneath with large basal tuft of black hairs. Forewings greyish-ochreous suffused with light brown-reddish, partly fuscous-tinged, somewhat sprinkled with blackish; first and second lines faintly pale, internally grey-edged, second followed by indistinct blackish dots; reniform forming a conspicuous clear white dot. Hindwings light fuscous or whitish-fuscous, terminally darker.

Kent to Devon, scarce, perhaps a recent immigrant; C. and S. Europe, Asia Minor; 8, 9. Larva pale greyish-ochreous, brownish-freckled; dorsal line pale, brown-edged; subdorsal pale, edged above with blackish, below with brown; lateral pale; spiracular whitish; head ochreous, reticulated with brown: on grasses; 11-6.

4. **L. Loreyi**, *Dup.* 37-39 mm. Abdomen in ♂ beneath with basal tuft of fuscous scales on each side. Forewings pale brownish-ochreous, more whitish costally; an indistinct median dash of black scales from base, nearly reaching a black dot at $\frac{2}{5}$; reniform forming a clear white dot; second line represented by a series of black dots; an oblique fuscous subapical suffusion. Hindwings white.

Sussex, a rare immigrant only; S. Europe, S. Asia, Africa, S. America; 7

5. **L. littoralis**, *Curt.* 33-36 mm. Abdomen in ♂ beneath with large basal tuft of black hairs. Forewings pale brownish-ochreous, costally whitish-ochreous, some veins white posteriorly; a narrow clear white median longitudinal streak from base to termen, edged with dark fuscous scales except posteriorly. Hindwings white.

Britain to Forfar, E. Ireland, on coasts, local; N. France, N. Germany; 6, 7. Larva pale pinkish-ochreous, grey, or greenish; dorsal and subdorsal lines white, dark-edged; lateral sometimes white; spiracular pale or whitish; head pale brown; on *Ammophila arundinacea;* 8-5.

(*L. l-album*, L., a pale brownish-ochreous species with clear white hooked median discal dash, and blackish interneural dashes posteriorly, and with large black basal tuft of abdomen in ♂, is said to have occurred in Kent, but the authenticity of the record is doubtful; it is common in C. and S. Europe.)

6. **L. conigera**, *F.* 29-35 mm. Forewings yellow-ochreous, suffusedly sprinkled with reddish-ochreous or brownish; first and second lines dark fuscous, first sharply angulated below middle; orbicular small, pale; reniform pale, narrow, surrounded by a darker suffusion, lower end forming a small subtriangular clear white spot; a somewhat darker terminal fascia. Hindwings light yellowish-fuscous, darker terminally.

Britain to Ross, Ireland, common; N. and C. Europe, Asia Minor; 7. Larva ochreous or brownish; dorsal and subdorsal lines pale yellow or greyish, black-edged; lateral pale yellow or greyish, sometimes black-edged; subspiracular blackish; head brownish, black-marked: on grasses; 9-5.

7. **L. vitellina**, *Hb.* 33-38 mm. Forewings pale yellow-ochreous, sprinkled with pale brown-reddish; first and second lines light brown-reddish, first dentate, second waved, much approximated dorsally; orbicular and reniform light brown-reddish, orbicular very small, lower end of reniform with a blackish dot; subterminal line brown-reddish, not reaching costa. Hindwings brassy-whitish.

Sussex to Devon, scarce, perhaps a recent immigrant; WC. and S. Europe, WC. Asia to Turkestan; 8, 9. Larva pale reddish-brown; dorsal, subdorsal, and lateral lines whitish, brown-edged; subspiracular pale; head reddish-brown, reticulated with black: on grasses; 10-5.

8. **L. comma**, *L.* 33-35 mm. Forewings whitish-ochreous, beneath costa black-sprinkled, veins whitish, suffusedly out-

lined with fuscous; a black median streak from base to near middle; reniform represented by a small whitish transverse mark; some black interneural streaks posteriorly. Hindwings grey, anteriorly whitish-suffused.

Britain to Perth, Ireland, common; N. and C. Europe, WC. and N. Asia; 6, 7. Larva varying from greyish-ochreous to reddish-brown; dorsal and subdorsal lines pale or whitish, edged with dark brown, with a brown line between them; lateral and spiracular pale ochreous, separated by a dark brown space; head brown, blackish-marked: on grasses; 8-4.

9. **L. putrescens,** *Hb.* 29-32 mm. Forewings whitish-ochreous, beneath costa black-sprinkled, veins obscurely whitish, suffusedly outlined with light purplish-fuscous; a slender black median dash from base; disc and a very irregular dentate terminal fascia purplish-fuscous; reniform forming a clear white dot; second line represented by a series of black dots. Hindwings white, termen fuscous.

Dorset and Devon to Caermarthen, local, on coast; W. and S. France, Spain; 7, 8. Larva greyish-ochreous to reddish-brown; dorsal line pale, dark-edged, on 2-4 almost white; subdorsal and lateral whitish, dark-edged, separated by a more ochreous-brown space; spiracular brown; subspiracular pale; head grey, darker-marked: on grasses; 10-2.

10. **L. obsoleta,** *Hb.* 35-38 mm. Forewings pale brownish-ochreous, more brownish in disc, with brown interneural lines; veins whitish, outlined with fuscous; reniform forming a clear white dot; second line represented by a series of black dots. Hindwings whitish, posteriorly suffused with fuscous, veins fuscous.

Kent to Bucks, Norfolk, Cheshire, E. Ireland, local; C. Europe; 6. Larva pale greyish-ochreous, sometimes reddish or greenish-tinged; dorsal line pale, edged with green; subdorsal pale or whitish, dark-edged; lateral whitish; spiracular darker or green; head marked with brown: on reed (*Phragmites*); 8, 9. The larva hides by day in the reedstems.

11. **L. unipuncta,** *Hw.* (*extranea,* Gn.) 33-42 mm. Forewings ochreous or pale ochreous, somewhat reddish-tinged, more or less strigulated with fuscous, sprinkled with black; orbicular and reniform sometimes paler, lower end of reniform forming a small whitish dot; second line indicated by a series of blackish dots; an oblique apical fuscous dash. Hindwings pale fuscous, darker posteriorly.

Kent to Cornwall, Suffolk, a rare immigrant only; Madeira, S. Asia, N. America, Australia, New Zealand; 8, 9.

12. **L. impudens**, *Hb.* (*pudorina*, Hb.) 35-40 mm. Forewings whitish-ochreous, tinged with pale rosy, sprinkled with blackish, veins pale; three or four grey interneural streaks posteriorly. Hindwings grey, slightly rosy-tinged.

England to York, S. Ireland, local; C. Europe, N. Asia; 7. Larva pale ochreous-brown; dorsal line pale, blackish-edged; a dark line below this; subdorsal pale or whitish, blackish-edged, strongly above; lateral dark-edged; spiracular fuscous; head pale brown, darker-marked: on reed (*Phragmites*) and grasses; 9-4.

13. **L. straminea**, *Tr.* 31-37 mm. Forewings whitish-ochreous, with a few black scales; veins whitish, outlined with pale rosy-brownish; fine pale rosy-brownish interneural lines; a darker suffusion beneath median vein; a small black dot representing reniform; second line indicated by two black dots. Hindwings grey-whitish, whiter towards costa, with postmedian series of ill-defined blackish marks.

Kent to Somerset and Norfolk, local; NC. Europe; 7, 8. Larva brownish-ochreous, grey-freckled; dorsal, subdorsal, and lateral lines fine, pale, edged with dark grey; subspiracular pale ochreous; head brownish-ochreous: on reed (*Phragmites*) and grasses; 9-5.

14. **L. impura**, *Hb.* 30-37 mm. Forewings whitish-ochreous, with a few black scales; veins pale, outlined with light reddish-brown; light reddish-brown interneural lines; a darker suffusion beneath median vein; a black dot representing reniform; second line usually indicated by two black dots. Hindwings dark grey.

Britain to the Hebrides, Ireland, very common; C. Europe, N. Asia; 7. Larva pale greyish-ochreous, sometimes reddish-tinged; dorsal, subdorsal, and lateral lines whitish, edged with dark brown, subdorsal more strongly above; spiracular brown or dark brown; head pale brownish, darker-marked: on grasses; 9-5.

15. **L. pallens**, *L.* 31-35 mm. Forewings whitish-ochreous, veins pale, outlined with rosy-ochreous; rosy-ochreous interneural lines; a minute black dot representing reniform; second line indicated by two minute black dots. Hindwings white, more or less tinged with ochreous or grey posteriorly.

Britain to Ross, Ireland, abundant; N. and C. Europe, Asia Minor, N. America; 6, 7. Larva ochreous or greyish-ochreous; dorsal line whitish, edged with dark grey, followed by a brownish shade; subdorsal whitish, edged above strongly with grey, beneath with brown; lateral and subspiracular pale ochreous; spiracular grey; head brown-marked: on grasses; 9-5.

14. Monima, *Hb.*

Head rough-haired; eyes hairy. Antennae in ♂ bipectinated or acutely bidentate, towards apex simple, basal joint with hairtuft. Thorax without distinct crest. Abdomen not crested.

A genus of rather few species, occurring throughout the temperate regions of the northern hemisphere, more commonly in America. The imagos all appear in early spring.

1. Antennae in ♂ bidentate . . . . 2.
 ,, bipectinated . . . 4.
2. Hindwings with postmedian series of elongate dots 3. *gracilis.*
 ,, without series of dots . . . 3.
3. Lower half of reniform blackish . . 1. *incerta.*
 ,, ,, not blackish . 2. *opima.*
4. Discal cell black round orbicular . . 9. *gothica.*
 ,, not black . . . . 5.
5. Hindwings white . . . . 6. *miniosa.*
 ,, not white . . . . 6.
6. Subterminal line conspicuously pale . . 7.
 ,, ,, hardly paler . . . 8.
7. Subterminal line preceded by two small dark marks 5. *populeti.*
 ,, ,, not preceded by two dark marks 4. *stabilis.*
8. Subterminal line preceded by two black spots 8. *munda.*
 ,, ,, not preceded by two black spots 7. *pulverulenta.*

1. **M. incerta,** *Hufn.* (*instabilis,* Esp.) 34-37 mm. Antennae in ♂ bidentate. Forewings dark purplish-grey, sometimes much mixed with light grey or suffused with ferruginous-brown; first and second lines usually indistinct, median shade darker; orbicular and reniform finely outlined with pale, reniform with lower half blackish; subterminal line grey-whitish, slightly irregular. Hindwings whitish-grey or grey, darker posteriorly; a darker discal crescent.

Britain to Ross, Ireland, very common; N. and C. Europe, N. Asia; 4. Larva green, with numerous yellowish or whitish dots; dorsal and spiracular lines pale yellow or whitish; subdorsal formed of pale dots; head green: on oak, poplar, hawthorn, etc.; 5-7.

2. **M. opima,** *Hb.* 34-37 mm. Antennae in ♂ bidentate. Forewings grey, brownish-tinged, median area darker and more brownish; first and second lines brown, indistinct; median shade suffused, brown; orbicular and reniform outlined with pale; subterminal line ochreous-whitish, nearly straight, anteriorly dark-edged. Hindwings fuscous or whitish-fuscous.

Sussex, W. and N. England from Somerset, S. Ireland, local; C. Europe; 3, 4. Larva dull olive-green to red-brown, darker-freckled; dorsal and subdorsal lines paler; spiracular yellow or yellowish-green, dark-margined above; head brownish: on *Salix* and rose; 5, 6.

3. **M. gracilis,** *F.* 35-40 mm. Antennae in ♂ bidentate. Forewings light grey, more or less suffused with light reddish-ochreous, especially in disc, with some black scales; first and second lines usually faintly darker, marked with black dots; orbicular and reniform outlined with pale, lower end of reniform darker; subterminal line pale reddish-ochreous, nearly straight. Hindwings whitish-fuscous, basally whiter; discal spot and a postmedian series of elongate dots dark fuscous.

Britain to the Clyde, Ireland, rather local; C. Europe; 4, 5. Larva dull-green or pinkish-brown; dorsal and subdorsal lines paler; spiracular pale greenish or seldom pinkish, edged above with dark grey or blackish; head pale brown or greenish: on *Salix*, *Carduus*, *Lysimachia*, etc.; 5-7.

4. **M. stabilis,** *View.* 31-35 mm. Antennae in ♂ bipectinated. Forewings light greyish-ochreous, sprinkled or suffused with grey, sometimes suffused with light reddish-ochreous, veins posteriorly pale; first and second lines faintly darker; median shade darker grey; orbicular and reniform outlined with pale, sometimes touching, reniform usually darker; subterminal line ochreous-whitish, nearly straight. Hindwings grey.

Britain to Ross, Ireland, abundant; C. and S. Europe; 3, 4. Larva green, with numerous yellow-whitish dots; dorsal, subdorsal, and spiracular lines yellow-whitish, sometimes very indistinct; anterior edge of 2 and posterior of 12 yellow-whitish; head green, sometimes black-dotted: on elm, oak, *Salix*, etc.; 5-7.

5. **M. populeti,** *Tr.* 33-35 mm. Antennae in ♂ bipectinated. Forewings brown-grey, slightly purplish-tinged; first, median, and second lines somewhat darker, especially on costa; orbicular and reniform darker, outlined with pale; subterminal line pale

greyish-ochreous, edged anteriorly in middle with two small red-brown or black marks. Hindwings grey.

England, E. and S. Ireland, local; C. Europe; 3, 4. Larva pale green or greenish-whitish; dorsal, subdorsal, and spiracular lines whitish; head pale greenish-ochreous, more or less black-marked: between joined leaves of poplar and aspen; 5-6.

6. **M. miniosa**, *F.* 31-35 mm. Antennae in ♂ bipectinated. Forewings pale greyish-ochreous, sprinkled with pale reddish and black, and much suffused with ferruginous-ochreous, especially on median area; first and second lines darker; orbicular and reniform darker, outlined with pale; subterminal line hardly paler, edged with darker marks anteriorly. Hindwings white, rosy-tinged; discal dot and postmedian line grey.

England, E. Ireland, local; C. Europe; 3, 4. Larva blue-grey to light pinkish-brown, reticulated with black; dorsal line yellow, irregular, edged by a row of black spots, followed by another of black dots; subdorsal yellow, sometimes obsolete; spiracular broad, yellow, black-dotted, edged above with black spots; head black-marked: on oak, hawthorn, rose, etc.; 5, 6.

7. **M. pulverulenta**, *Esp.* (*cruda*, Tr.) 26-29 mm. Antennae in ♂ bipectinated. Forewings pale greyish-ochreous, more or less mixed with light ferruginous-ochreous, sprinkled with black and sometimes strigulated with grey; subbasal, first, and second lines indicated by indistinct blackish dots; orbicular and reniform grey, outlined with pale, lower end of reniform darker; subterminal line obscurely paler. Hindwings grey.

Britain to Perth, Ireland, very common; C. and S. Europe; 3, 4. Larva green or brown, with pale yellowish dots; dorsal and subdorsal lines pale yellow or whitish; spiracular yellow, often spotted with reddish; posterior edge of 12 pale yellowish or whitish; head sometimes marked with white or black: on oak, hawthorn, *Salix*, etc.; 5, 6.

8. **M. munda**, *Esp.* 38-41 mm. Antennae in ♂ bipectinated. Forewings pale brownish-ochreous, thinly sprinkled with black, somewhat mixed with light ochreous-brown, faintly reddish-tinged; a black median subbasal dot; first, median, and second lines sometimes darker; orbicular and reniform outlined with pale, lower end of reniform reddish-grey; subterminal hardly paler, edged anteriorly in middle by two conspicuous black spots, and at extremities with red-brown or blackish. Hindwings fuscous.

Britain to the Clyde, Ireland, local; C. Europe; 3, 4. Larva pale ochreous, much marked with brown; tubercular dots white;

dorsal line pale, brown-edged; spiracular pale, marked with white on 4-7 or part of them, edged above with a dark brown or blackish stripe; posterior edge of 12 pale, preceded by dark spots; head marked with brown or black: on oak, birch, poplar, etc.; 5, 6.

9. **M. gothica,** *L.* 31-35 mm. Antennae in ♂ bipectinated. Forewings purple-reddish-brown, more or less mixed with grey, darkest in disc; subbasal line partly blackish-edged; first and second lines pale, dark-edged; orbicular and reniform outlined with pale, discal cell black from first line to reniform; a blackish submedian dash before second line; subterminal line pale or yellowish, darker-edged anteriorly. Hindwings grey.

Britain to the Orkneys, Ireland, very common; 4, 5. Larva light green, with numerous pale yellowish dots; dorsal and subdorsal lines pale yellowish or whitish; spiracular very broad, whitish, dark-edged above; head light green: on oak, *Salix*, hawthorn, etc.; 5-7.

15. CHARAEAS, *Stph.*

Head rough-scaled; eyes hairy. Antennae in ♂ bipectinated, towards apex simple. Thorax without distinct crest. Abdomen not crested.

Includes the following species only:—

1. **C. graminis,** *L.* 29-37 mm. Forewings brown or brownish-ochreous, disc darker or mixed with dark fuscous; median vein white in disc to beyond origin of branches, more broadly posteriorly; spots pale ochreous; subterminal line indicated by posterior series of dark fuscous spots or suffusions. Hindwings grey, darker posteriorly.

Britain to the Shetlands, Ireland, in dry open grassy places, common, sometimes abundant; N. and C. Europe, N. Asia, N. America; 7-9. Larva much wrinkled, greenish-ochreous to dark bronzy-brown; dorsal, subdorsal, lateral, and subspiracular lines pale, blackish-edged; head brownish, dark-marked: on grasses; 4-6. The larva sometimes appears in exceptional profusion, and is then naturally very destructive.

16. NEURONIA, *Hb.*

Head rough-scaled; eyes hairy. Tongue short, slight. Antennae in ♂ bipectinated to apex. Thorax with slight anterior and posterior crests. Abdomen slightly crested near base.

Also restricted to a single species; it is a development of *Melanchra*, and approaches nearest *M. cespitis*.

1. **N. popularis,** *F.* 36-41 mm. Forewings brown, veins whitish; first and second lines edged with dark fuscous; spots outlined with dark fuscous, orbicular and reniform edged with whitish; subterminal line whitish, preceded by dark fuscous spots. Hindwings whitish-fuscous, with fuscous subterminal suffusion.

Britain to Perth, Ireland, rather common; C. Europe, Asia Minor, N. Asia; 8, 9. Larva bronzy-brown; dorsal, subdorsal, lateral, and subspiracular lines pale ochreous, blackish-edged; head brownish, blackish-marked: on grasses; 4-6.

17. Panolis, *Hb.*

Head rough-haired; eyes hairy. Antennae in ♂ dentate, ciliated. Palpi very short, clothed with long rough hairs. Thorax without distinct crest. Abdomen not crested.

The single species is a development of *Melanchra.*

1. **P. piniperda,** *Panz.* 31-35 mm. Forewings light reddish, disc more ochreous-tinged, veins mixed with dark grey and white; subbasal, first, and second lines deeper red; orbicular white, sending a projection along median vein; reniform bent, edged with white; subterminal line indicated by darker margin. Hindwings dark grey, reddish-tinged.

Britain to Ross, E. and W. Ireland, rather common; N. and C. Europe; 4. Larva varying from deep green to pale brown, with scattered black dots; dorsal line white; subdorsal white, sometimes double, black-edged; spiracular white, edged beneath with orange or yellow; head brownish: on *Pinus sylvestris;* 6, 7.

18. Harmodia, *Hb.*

Head rough-scaled; eyes hairy. Antennae in ♂ ciliated. Thorax with more or less developed anterior and posterior crests. Abdomen more or less crested, in ♀ acutely pointed.

A characteristically European genus of about thirty species, of which the larvae appear all to feed on *Caryophyllaceae* (*Silene* and its allies), usually in the seed-vessels.

1. Forewings with white space beneath orbicular . 2.
,, without white space beneath orbicular 4.
2. Lower half of median area wholly white . 3. *compta.*
,, ,, not white . . 3.
3. Costal space above orbicular white . 2. *albimacula.*
,, ,, not white . 1. *nana.*
4. Forewings bluish-grey . . . 5. *caesia.*
,, not bluish-grey . . . 5.

5. Termen of forewings dark-marked . . 6.
„ „ not dark-marked . 4. *irregularis*.
6. Claviform suffusedly whitish . . 6. *luteago*.
„ not whitish . . . . 7.
7. Orbicular and reniform touching beneath 9. *cucubali*.
„ „ not touching . . 8.
8. Orbicular oblique-oval . . . 8. *capsincola*.
„ roundish . . . 7. *carpophaga*.

1. **H. nana**, *Rott.* (*conspersa*, Esp.) 31-36 mm. Forewings fuscous, purplish-tinged, with suffused white basal, apical, and two dorsal blotches ; subbasal, first, and second lines edged with black ; orbicular and a confluent blotch below it white, outlined with black, reniform edged with white and outlined with black, space between them white or yellowish ; subterminal line white, blackish-edged. Hindwings light fuscous, darker posteriorly.

Britain to the Shetlands, N. and E. Ireland, local, commoner northwards ; Europe, Asia Minor, N. Asia ; 6-7. Larva pale brownish-ochreous ; dorsal line pale, traversing a series of dark V-shaped marks ; two lateral pale brownish lines ; spiracular whitish ; spiracles pink ; head pale brownish, with four dark streaks ; in seed-capsules of *Lychnis* and *Silene* ; 7-9.

2. **H. albimacula**, *Bkh.* 32-35 mm. Forewings yellowish-brown ; subbasal line white, black-edged, preceded by a white spot ; first and second lines black, externally finely white-edged ; orbicular white, brown-centred, outlined with black, placed in a white blotch extending from costa to below middle ; reniform partly white-edged, outlined with black ; subterminal line fine, whitish, interrupted, black-edged anteriorly. Hindwings light fuscous, darker posteriorly.

Kent, Hants, Devon, scarce, perhaps not constantly resident ; Europe, NW. and WC. Asia ; 6. Larva pale brownish-ochreous ; dorsal line fine, obscurely pale, traversing a series of blackish spots connected with indistinct V-shaped marks ; supra-spiracular waved, fuscous, indistinct ; head brown-streaked : in seed-capsules of *Silene nutans* ; 7, 8.

3. **H. compta**, *F.* 29-31 mm. Forewings fuscous, purplish-tinged ; subbasal line white, black-edged, preceded by a white spot, a ferruginous median dash beyond it ; first and second lines blackish-edged, extremities white ; spots outlined with black, orbicular white, reniform white-edged ; lower half of median area wholly white except roundish claviform ; subterminal whitish, interrupted, edged with blackish spots. Hindwings light fuscous, darker posteriorly.

E. Ireland (Dublin) scarce and local; C. and S. Europe, Asia Minor, Syria, NW. Asia; 5, 6. Larva in seed-capsules of *Dianthus;* 7, 8.

4. **H. irregularis,** *Hufn.* (*echii*, Bkh.) 28-31 mm. Forewings whitish-ochreous, irregularly suffused with pale ochreous-brownish; first and second lines edged externally with ochreous-brownish, internally with dark brown; median line ochreous-brown; orbicular and reniform outlined with pale; subterminal line pale, edged anteriorly with ochreous-brown; termen unmarked; cilia barred. Hindwings light fuscous, with darker postmedian line and subterminal band.

Suffolk, Norfolk, Cambridge, local; C. Europe, Asia Minor; 6, 7. Larva in seed-capsules of *Silene otites;* 8. This species is necessarily confined in Britain within the very narrow range of its food-plant.

5. **H. caesia,** *Bkh.* 33-35 mm. Forewings light bluish-grey, darker-sprinkled, in disc and towards middle of base lighter and yellowish-tinged; lines faintly paler; orbicular and reniform faintly outlined with paler. Hindwings grey, darker posteriorly.

Isle of Man, S. Ireland (Waterford), on cliffs, very local; mountains of C. Europe; 6. Larva pale brownish-ochreous, irrorated with brown; a dorsal series of darker V-shaped marks, indistinct before 5; subdorsal line darker; head brown, darker-marked: in seed-capsules of *Silene inflata* and *S. maritima;* 7, 8.

6. **H. luteago,** *Hb.* (*Barrettii*, Dbld.) 33-39 mm. Forewings rather dark fuscous, whitish-mixed except in disc; subbasal, first, and second lines dark-edged; median somewhat darker; orbicular and reniform whitish-edged; claviform whitish, suffused above; subterminal line whitish; a terminal series of blackish marks. Hindwings rather dark fuscous.

Devon, Pembroke, E. Ireland, local and uncommon; C. Europe, NW. Asia; 6, 7. Larva pale ochreous, somewhat pinkish-tinged; dorsal line faintly fuscous; head reddish-ochreous, blackish-marked: in roots of *Silene maritima* and *S. inflata;* 7-9.

7. **H. carpophaga,** *Bkh.* (*capsophila*, Dup.) 27-33 mm. Forewings brown or pale brown, mixed with darker, sometimes whitish sprinkled; subbasal line edged with blackish; first and second lines edged externally with brown, internally with black-brown; median line dark brown; spots outlined with black, orbicular and reniform edged with whitish; subterminal

line whitish, edged anteriorly towards middle with black wedgeshaped marks; a terminal series of blackish marks. Hindwings light fuscous, posteriorly darker.

Britain to the Clyde, Ireland, common; Europe, Asia Minor, NW. Asia; 6, 7. Larva pale greyish-ochreous or brownish-ochreous; dorsal, subdorsal, and spiracular lines pale; head light brown, darker-marked: in seed-capsules of *Silene inflata* and *S. maritima;* 7, 8.

8. **H. capsincola**, *Hb.* 33 - 37 mm. Forewings brown, sprinkled with dark fuscous; subbasal, first, and second lines blackish-edged; spots outlined with black, orbicular and reniform edged with whitish, claviform broad, suffused with dark fuscous; subterminal line whitish, edged anteriorly with dark fuscous marks; a terminal series of blackish marks. Hindwings pale fuscous, posteriorly darker.

Britain to the Orkneys, Ireland, common; Europe, NW. Asia; 6, 8. Larva light brownish-ochreous, brown-sprinkled; dorsal line pale, indistinct, traversing a series of dark V-shaped marks; head darker-marked: in seed-capsules of *Silene* and *Lychnis;* 7-9.

9. **H. cucubali**, *Fuesl.* 31-35 mm. Forewings brown, veins suffused with pale purplish; subbasal line ochreous-whitish, black-edged; first and second lines pale purplish, blackish-edged; spots outlined with blackish, orbicular and reniform edged with pale yellowish, touching at lower angle, claviform broad, suffused with dark brown; subterminal line pale yellowish, suffusedly edged with blackish; a terminal series of blackish marks. Hindwings light fuscous, posteriorly darker.

Britain to Ross, Ireland, common; N. and C. Europe, NW. Asia; 6. Larva greenish-grey, orange-tinged, with numerous white dots; dorsal line brown; subdorsal series of oblique brown marks; head dark-marked: in seed-capsules of *Silene* and *Lychnis;* 7, 8.

19. MELANCHRA, *Hb.*

Head rough-scaled; eyes hairy. Antennae in ♂ ciliated, or sometimes bipectinated with apex simple. Thorax with more or less developed anterior and posterior crests. Abdomen more or less crested, in ♀ obtuse. Anterior tibiae rarely with apical hook.

A large genus of very general distribution, but much commoner in temperate regions of both hemispheres.

1. Anterior tibiae with apical hook . . 19. *brassicae.*
,, ,, without apical hook . . . 2.
2. Hindwings orange-yellow . . . . 3.
,, not yellow . . . 4.
3. Forewings ferruginous-red . . 22. *myrtilli.*
,, dark grey . . . 23. *cordigera.*
4. Antennae in ♂ bipectinated . . . 5.
,, ,, not bipectinated . . . 6.
5. Hindwings white . . . . 1. *cespitis.*
,, light fuscous . . . 15. *leucophaea.*
6. Hindwings white . . . . . 7.
,, not white . . . . 8.
7. Forewings with black median basal dash
8. *conspicillaris.*
,, without such dash . . 24. *melanopa.*
8. Claviform obsolete . . . . 9.
,, distinct . . . . 10.
9. Subterminal line strong, yellowish, irregular 14. *pisi.*
,, ,, fine, white, with median teeth
13. *oleracea.*
10. Claviform followed by a black dash . . 11.
,, not followed by a black dash . . 14.
11. Forewings with black median basal dash . . 12.
,, without such dash . . 7. *glauca.*
12. Orbicular edged with whitish . . . 31.
,, not edged with whitish . 10. *genistae.*
13. Orbicular connected with tornus by pale suffusion
9. *contigua.*
,, without such connection . 11. *thalassina.*
14. Subterminal line forming pale dots . . 15.
,, ,, entire . . . . 17.
15. Reniform almost wholly white . . 20. *persicariae.*
,, at most white-marked . . . 16.
16. Edges of spots mixed with orange . 4. *chrysozona.*
,, ,, not mixed with orange . 21. *albicolon.*
17. Forewings white . . . . 3. *serena.*
,, not white . . . . 18.
18. Orbicular and claviform connected posteriorly by
pale spot . 6. *dentina.*
,, ,, ,, not so connected . 19.
19. Forewings with dark praesubterminal spot above
tornus . . . . 20.
,, without such spot . . . 22.

20. Spots outlined with brown . . 17. *advena.*
„ „ „ black . . . 21.
21. Forewings with conspicuous black median praesubterminal spot . . 16. *tincta.*
„ without such spot . . 18. *nebulosa.*
22. Forewings with black median basal dash . 12. *dissimilis.*
„ without such dash . . . 23.
23. Forewings with veins conspicuously pale . 2. *reticulata.*
„ „ „ not conspicuously pale 5. *trifolii.*

1. **M. cespitis,** *F.* 31-37 mm. Antennae in ♂ shortly bipectinated. Forewings rather dark fuscous; first and second lines obscurely pale, internally black-edged; spots finely outlined with blackish, orbicular and reniform edged with fuscous-whitish; subterminal line fuscous-whitish. Hindwings white, postmedian line and termen sometimes fuscous.

Britain to Ross, N. and E. Ireland, local, scarce in Scotland; C. Europe; 8. Larva bronzy olive-brown; dorsal, subdorsal, and spiracular lines whitish, dark-edged; lateral hardly paler, dark-edged; head brownish: on grasses; 4-6.

2. **M. reticulata,** *Vill.* (*saponariae,* Bkh.) 37-42 mm. Forewings brown, veins whitish-ochreous except before subterminal line, with darker interneural marks; subbasal, first, second, and subterminal lines whitish-ochreous; spots outlined with dark fuscous, orbicular and reniform edged with whitish-ochreous. Hindwings whitish-fuscous, with fuscous terminal suffusion.

England to York, not common; N. and C. Europe, NW. Asia; 6, 7. Larva light greenish-ochreous or pinkish-ochreous, darker-freckled; dorsal, subdorsal, lateral, and spiracular lines faintly paler; head light brownish: on *Silene*, *Rumex*, *Primula*, etc.; 8-4.

3. **M. serena,** *F.* 29-33 mm. Forewings white, median area grey; subbasal line edged with black; first and second lines edged internally with black, externally with grey; median line black; spots outlined with black, orbicular and reniform edged with white; subterminal line edged by some black marks, terminal space grey. Hindwings light grey, with dark posterior suffusion.

Britain to Forfar, E. and W. Ireland, rather common; C. and S. Europe, WC. Asia to Turkestan; 6, 7. Larva dull yellowish-green, with dark grey irroration forming obscure blotches; spiracular line yellower, well-marked; head greenish-ochreous: on flowers of *Sonchus* and *Lactuca;* 7, 8.

4. **M. chrysozona,** *Bkh.* (*dysodea,* Hb.) 30-33 mm. Fore-

wings whitish irrorated with grey, median area suffused with grey and partly mixed with orange; subbasal line whitish, edged anteriorly with black mixed with orange; first and second lines whitish, edged internally with blackish; spots outlined with black mixed with orange; subterminal line formed of orange spots, preceded by some black scales. Hindwings pale grey, with darker posterior suffusion.

S. England to Worcester and Norfolk, local; C. and S. Europe, WC. Asia to Turkestan; 7. Larva pale dull green, or yellowish freckled with brown; dorsal line pale, dark-edged; lateral dark, indistinct; spiracles black; head ochreous-brown or dull greenish: on flowers of *Sonchus* and *Lactuca;* 7, 8.

5. **M. trifolii**, *Rott.* (*chenopodii*, F.) 34-37 mm. Forewings greyish-ochreous sprinkled with grey; subbasal, first, and second lines hardly paler, darker-edged; median line darker; spots outlined with black, orbicular and reniform edged with pale, reniform with a grey inner ring; subterminal line obscurely pale, with two strong teeth below middle. Hindwings whitish-fuscous, with fuscous terminal band.

England to York, common; Europe, N. Africa, N. and C. Asia, N. America; 6, 7. Larva green, black-freckled; dorsal line pale; subdorsal pinkish-white or yellowish-white, edged above with black marks; spiracular pink edged with white, marked above with black; head greenish: on *Chenopodium* and *Atriplex;* 7-9.

6. **M. dentina**, *Esp.* 31-35 mm. Forewings light ochreous-grey, median area mostly suffused with brown or dark fuscous; subbasal line pale, black-edged; an indistinct orange dorsal suffusion beyond this; first and second lines pale, internally blackish-edged; spots outlined with black, orbicular and reniform pale-edged, an irregular angular pale or whitish spot limiting orbicular beneath and claviform posteriorly; subterminal line whitish, partly black-edged, with two moderate submedian teeth. Hindwings grey, darker posteriorly.

Britain to the Shetlands, Ireland, common; Europe, Asia Minor, NW. Asia; 6, 7. Larva light brown-grey; a dorsal series of connected blackish spots, edged with white; spiracular line darker; lateral and subspiracular less marked: on roots of *Taraxacum;* 5..

7. **M. glauca**, *Hb.* 31-37 mm. Forewings ashy-fuscous mixed with ashy-whitish; subbasal, first, and second lines pale, blackish-edged; spots outlined with blackish, orbicular and reniform suffused with ashy-whitish, claviform roundish, suf-

fused with whitish-ochreous, emitting a black dash posteriorly; subterminal line whitish-ochreous, edged anteriorly with blackish, with two moderate median teeth. Hindwings fuscous.

Britain from Norfolk and Worcester to the Orkneys, N. and E. Ireland, common, scarcer southwards; N. and C. Europe; 6. Larva brown, darker-freckled; dorsal line narrow, darker; subdorsal series of oblique dark and light markings; spiracular whitish; head pale brown, darker-freckled: on *Salix*, *Tussilago*, etc.; 7, 8.

8. **M. conspicillaris**, *L.* 33-41 mm. Forewings variably mixed with fuscous, dark fuscous, and whitish, dorsal area usually pale, veins posteriorly black; markings in dark specimens obscured; a black median dash from base; spots outlined with black, orbicular and reniform usually pale-edged; median shade sometimes darker; subterminal line suffusedly pale. Hindwings white, termen and veins fuscous.

Kent to Suffolk and Worcester, local and uncommon; C. Europe, WC. Asia; 4-6. Larva greenish-ochreous, freckled with fuscous, forming darker dorsal blotches; dorsal and subdorsal lines obscurely dark-edged; spiracular pale reddish-ochreous, dark-edged above; head pale pinkish-ochreous, blackish-marked: on *Lotus*, *Polygonum*, etc.; 6-8.

9. **M. contigua**, *Vill.* 34-38 mm. Forewings pale fuscous, mixed with whitish and reddish-fuscous; a black median dash from base, surmounted by a pale ochreous-tinged blotch; first and second lines pale, darker-edged; spots outlined with blackish, orbicular edged with whitish, claviform emitting a black dash posteriorly; a pale suffusion extending from orbicular to tornus; subterminal line white, with two strong median teeth preceded by blackish wedges. Hindwings whitish-fuscous, darker posteriorly.

Britain to Sutherland, Ireland, local; N. and C. Europe, NW. Asia; 6, 7. Larva dull yellowish-green, above suffused with orange-ochreous and freckled with brown-reddish, forming dorsal series of V-shaped marks; spiracular brown-reddish: on oak, birch, *Solidago*, etc.; 8, 9.

10. **M. genistae**, *Bkh.* (*w-latinum*, Bkh.) 39-43 mm. Forewings pale brown, reddish-tinged, partly whitish-sprinkled; a black median dash from base, surmounted by a pale ochreous-tinged suffusion; first and second lines pale, partly black-edged internally; spots partly outlined with black, claviform darker and traversed by a black dash reaching second line; subterminal line yellow-whitish, with two strong median teeth traversed by blackish dashes. Hindwings light fuscous.

England to York, Renfrew, E. Ireland, rather common; C. Europe, N. Asia; 5, 6. Larva dull brown, sometimes greenish or purplish-tinged; dorsal and subdorsal lines dark-edged, indistinct; dorsal series of darker diamonds and wedges; head black-marked: on *Genista*, *Polygonum*, *Stellaria*, etc.; 7-9.

11. **M. thalassina**, *Rott.* 36-43 mm. Forewings reddish-brown, partly sprinkled with whitish and whitish-ochreous; a black median dash from base, surmounted by a whitish-ochreous suffusion; lines ochreous-whitish, partly black-edged internally; spots partly outlined with black, orbicular suffusedly edged with whitish-ochreous, claviform emitting a black dash posteriorly; subterminal line yellow-whitish, with two strong median teeth preceded by blackish wedges. Hindwings light grey, posteriorly darker, with distinct darker discal crescent.

Britain to the Orkneys, Ireland, common; N. and C. Europe, N. Asia; 5, 6. Larva pale pinkish-brown, freckled with dark brown; a double dorsal series of oblique darker marks; dorsal line indistinct; spiracular pale, edged above with white or black, or wholly black: on birch, *Lonicera*, *Polygonum*, etc.; 7, 8.

12. **M. dissimilis**, *Kn.* (*suasa*, Bkh.) 34-41 mm. Forewings reddish-grey; a black median dash from base; first and second lines obscurely pale or grey-whitish; spots partly finely outlined with black, orbicular and reniform obscurely pale-edged; subterminal line fine, whitish, with two strong median teeth. Hindwings pale fuscous, darker posteriorly.

Britain to the Clyde, E. Ireland, local; N. and C. Europe, N. Asia; 6. Larva green or brown, white-dotted, freckled with dark grey; dorsal and subdorsal lines darker, variable; spiracular yellow-ochreous, edged above with brown or black, below with light reddish: on *Rumex*, *Chenopodium*, *Plantago*, etc.; 7, 8.

13. **M. oleracea**, *L.* 35-40 mm. Forewings purple-reddish-brown, somewhat whitish-sprinkled; first and second lines very faint; median shade somewhat darker, angulated; orbicular and reniform usually edged with whitish, reniform including a suffused yellow-ochreous or whitish-yellow spot; subterminal line fine, white, with two sharp median teeth. Hindwings whitish-fuscous, with fuscous discal crescent and posterior suffusion.

Britain to the Shetlands, Ireland, very common; Europe, Asia Minor; 6. Larva green or brown, white-dotted; ordinary dots black; spiracular line yellow, edged above with dark grey; on *Urtica*, *Rumex*, elm, *Brassica*, etc.; 7-9.

14. **M. pisi**, *L.* 35-39 mm. Forewings purple-reddish, mixed with ferruginous-ochreous; first and second lines hardly paler, darker-edged; median shade darker; orbicular and reniform partly outlined with ferruginous-brown, hardly pale-edged; subterminal line strong, whitish-yellow, irregular, rather dilated and angulated near tornus, partly ferruginous-edged anteriorly. Hindwings pale fuscous, suffused with whitish-ochreous anteriorly, with fuscous subterminal suffusion.

Britain to the Orkneys, Ireland, common; N. and C. Europe; 6. Larva green or purple-brown, black-dotted; subdorsal line yellow, black-edged; spiracular yellow or pale greenish, black-edged above; head pale green or pinkish-ochreous; legs sometimes rosy: on *Pteris*, *Cytisus*, *Scabiosa*, etc.; 8-10.

15. **M. leucophaea**, *View.* 37-41 mm. Antennae in ♂ bipectinated. Forewings light brown, partly sprinkled with white, basally suffused with light ochreous; a short black median basal dash joining black edge of whitish subbasal line; first and second lines pale, internally black-edged; median shade suffusedly dark fuscous; spots outlined with black, orbicular and reniform edged with white; subterminal line whitish, preceded by dark fuscous wedges, with two moderate median teeth. Hindwings light fuscous, with darker discal crescent.

Kent, Surrey, local and scarce; C. and SE. Europe, NW. Asia; 5-7. Larva ochreous or brownish-ochreous; dorsal line pale, traversing a double series of oblique blackish marks; subdorsal indistinct; spiracular pale, edged with blackish marks above: on grasses; 6-4.

16. **M. tincta**, *Brh.* 42-50 mm. Forewings light fuscous, partly crimson-tinged, much suffused with greenish-whitish; first and second lines pale, darker-edged; median line fuscous; spots outlined with black, orbicular and reniform edged with whitish; subterminal line whitish, brown-edged, strongly edged anteriorly with reddish-black in middle and towards tornus. Hindwings light fuscous, darker posteriorly.

Britain to Sutherland, local; N. and C. Europe, NW. Asia; 6, 7. Larva pale reddish-brown, finely freckled with black and white; dorsal line slender, whitish, blackish-edged; head brown: on birch, *Vaccinium*, grasses, etc.; 9-5.

17. **M. advena**, *F.* 41-48 mm. Forewings light brown, rosy-tinged in disc, somewhat whitish-sprinkled; a fine dark brown median basal dash joining edge of subbasal line; first and second lines obscurely pale, darker-edged; spots outlined with brown, orbicular and reniform pale-edged, posterior edge

of reniform whitish; subterminal line obscurely pale, anteriorly brown-edged, more strongly in middle and towards tornus. Hindwings light ochreous-fuscous, with darker terminal suffusion.

Britain to Perth, local; N. and C. Europe, N. Asia; 6, 7. Larva pale brown, sides darker, freckled with grey; dorsal line pale, brown-edged; spiracles bright red-brown, black-edged: on *Sonchus*, *Achillea*, *Polygonum*, etc.; 8-4.

18. **M. nebulosa**, *Hufn.* 45-54 mm. Forewings light grey, sometimes ochreous-tinged, suffusedly sprinkled with white; subbasal, first, and second lines whitish, blackish-edged, subbasal connected with base in middle; median line blackish, distinct on upper half; spots outlined with black, whitish-edged; subterminal line obscurely whitish, slender, anteriorly blackish-edged, preceded by a black spot above tornus. Hindwings pale grey, ochreous-tinged, with darker terminal suffusion.

Britain to Caledonian Canal, Ireland, common; C. Europe, WC. Asia; 6, 7. Larva light brown, sides darker; dorsal line pale, traversing a series of dark diamonds; supraspiracular indistinctly dark: on birch, willow, elm, etc.; 9-5.

19. **M. brassicae**, *L.* 33-43 mm. Anterior tibiae with apical hook. Forewings grey, slightly reddish-tinged, sprinkled with black; subbasal, first, and second lines blackish-edged; spots partly outlined with blackish, reniform partly edged with white dots and marks, sometimes with white central mark; subterminal line whitish, with two moderate median teeth. Hindwings light grey, darker posteriorly.

Britain to the Shetlands, Ireland, very common; Europe, Asia Minor, N. Asia; 5-8. Larva brown to dull green, sometimes blackish-marked; dorsal line darker; subspiracular dull yellowish; 12 somewhat raised; head yellowish-brown, darker-marked: on *Brassica*, *Rumex*, *Chenopodium*, etc.; 6-9. This larva is very destructive to garden cabbages.

20. **M. persicariae**, *L.* 37-41 mm. Forewings dark purplish-fuscous; subbasal, first, and second lines black-edged; median line blackish; spots outlined with black, orbicular blackish-centred, reniform clear white, brownish-centred; subterminal line formed by pale ochreous dots, blackish-edged. Hindwings ochreous-whitish, fuscous-tinged, with rather dark fuscous discal mark and broad terminal suffused band.

Britain to Forfar, S. Ireland, local; C. and SE. Europe; 6, 7. Larva green to brown; dorsal line whitish, traversing a double series of oblique dark marks, darkest on 5 and 6; spiracular whitish, sometimes edged above with oblique dark marks; 12 prominent above: on *Rumex*, *Pteris*, *Chrysanthemum*, etc.; 8, 9.

21. **M. albicolon**, *Hb.* 37-40 mm. Forewings fuscous, somewhat sprinkled with whitish and dark fuscous; subbasal, first, and second lines edged with dark fuscous; spots outlined with black, reniform with two white marks on lower posterior angle; subterminal line forming a series of ochreous-whitish dots. Hindwings whitish-fuscous, with darker terminal suffusion.

Britain to Caledonian Canal, E. Ireland, local; C. Europe, NW. Asia; 5, 6. Larva green; dorsal line fine, pale, dark-edged; spiracular pale, including a darker line; head pale green: on *Chenopodium*, *Atriplex*, *Sisymbrium*, etc.; 7, 8.

22. **M. myrtilli**, *L.* 22-25 mm. Forewings ferruginous-red, mixed with black and pale ochreous; veins partly white; subbasal line pale ochreous, white towards costa; first and second lines pale ochreous, internally black-edged, white on costa; orbicular and reniform outlined with black, orbicular with a white adjacent spot beneath; subterminal line white. Hindwings orange-yellow; base, costa, and dorsum narrowly blackish; a broad black terminal band.

Britain to the Orkneys, Ireland, common; N., C., and SW. Europe; 6, 7. Larva green, sometimes brownish-tinged, with scattered pale yellowish or whitish marks; dorsal, subdorsal, and spiracular series of whitish spots: on *Erica;* 8, 9.

23. **M. cordigera**, *Thnb.* 22-25 mm. Forewings dark grey mixed with black, basal and terminal areas sprinkled with grey-whitish; first and second lines blackish; reniform large, white, including a blackish mark; subterminal line indistinctly indicated with blackish. Hindwings orange-yellow; base and costa blackish; a black terminal fascia.

Forfar to Caledonian Canal, local; N. and C. Europe, N. America; 5, 6. Larva purplish-brown mixed with black; dorsal line whitish; subdorsal indistinct; subspiracular brownish-ochreous, reddish-marked: on *Vaccinium;* 7, 8.

24. **M. melanopa**, *Thnb.* 25-31 mm. Forewings brown, densely sprinkled with black and white; first and second lines black, more or less interrupted; spots outlined with black; subterminal line indicated by several blackish spots. Hindwings white; dorsum broadly dark grey; a blackish discal crescentic spot and terminal fascia.

Lanark to the Shetlands, local; N. and mountains of C.

Europe, N. America; 6. Larva purplish-rosy; dorsal line ochreous-brown, edged with dark grey, marked with reddish spots; subdorsal yellowish, black-edged; series of black marks above and below this; spiracular pale yellow, red-marked: on *Vaccinium;* 6, 7.

Sub-Fam. 3. *CARADRINIDES.*

Eyes glabrous, not ciliated.

20. AGROTIS, *O.*

Head rough-scaled; eyes glabrous. Antennae in ♂ ciliated, often acutely bidentate or bipectinated with apex simple. Thorax usually with more or less developed anterior and posterior crests. Abdomen not crested. Tibiae all spinose.

A very large genus, occurring all over the world but much more plentifully in the northern hemisphere. The larvae are very indiscriminate in their tastes, often feeding on almost any low plant; they are frequently subterranean in habit, but usually emerge by night to feed.

1.	Hindwings orange	2.
	,, not orange	4.
2.	Hindwings with blackish discal mark	3.
	,, without blackish discal mark	32. *pronuba.*
3.	Forewings with black costal mark before subterminal line	34. *orbona.*
	,, without such mark	33. *comes.*
4.	Forewings dark fuscous with whitish veins	45. *typica.*
	,, not dark fuscous with whitish veins	5.
5.	Claviform dot-like, blackish	6.
	,, not dot-like	8.
6.	Forewings with blackish discal dot before first line	41. *festiva.*
	,, without such dot	7.
7.	Subterminal line pale yellowish	40. *Dahlii.*
	,, ,, not yellowish	39. *rubi.*
8.	Claviform more or less distinctly marked	9.
	,, obsolete	28.
9.	Forewings light grey-greenish	10. *praecox*
	,, not greenish	10.
10.	Subterminal line preceded by three or four dark fuscous wedges	11.
	,, ,, not so preceded	12.

11. Orbicular narrow-elongate . . 1. *vestigialis.*
„ round . . . . 18. *tritici.*
12. Forewings with black median basal dash . . 13.
„ without black basal dash . . 16.
13. Posterior half of collar conspicuously darker 28. *flammatra.*
„ „ „ not conspicuously darker . 14.
14. Costa broadly whitish-suffused to beyond middle 17. *agathina.*
„ not whitish-suffused . . . 15.
15. Orbicular small, white . . . 16. *strigula.*
„ moderate, pale-edged . . 7. *obelisca.*
16. Reniform followed by a short black dash . 4. *ypsilon.*
„ not followed by a black dash . . 17.
17. Forewings darker-strigulated; antennae in ♂ pectinated . . . 18.
„ not strigulated; antennae in ♂ dentate or ciliated . . . 19.
18. Hindwings pale grey . . 2. *corticea.*
„ white . . . . 3. *segetum.*
19. Claviform wholly blackish . . . 20.
„ not wholly blackish . . . 21.
20. Orbicular small, whitish . . . 5. *lunigera.*
„ not whitish . . 6. *exclamationis.*
21. Hindwings whitish or whitish-fuscous . . 22.
„ fuscous . . . . 26.
22. Subterminal line forming whitish dots . 8. *nigricans.*
„ „ not forming whitish dots . 23.
23. First and second lines black-dotted . . 24.
„ „ „ not black-dotted . . 25.
24. Forewings reddish-tinged . . . 14. *puta.*
„ not reddish-tinged . . 13. *ripae.*
25. Veins partly whitish-marked . . 11. *cursoria.*
„ not whitish-marked . 9. *saucia.*
26. Forewings partly whitish-sprinkled . 20. *occulta.*
„ not whitish-sprinkled . . . 27.
27. Reniform suffused with pale yellowish . 35. *brunnea.*
„ not yellowish-marked . . 19. *augur.*
28. Forewings with broad whitish costal suffusion 15. *plecta.*
„ without whitish costal streak . . 29.
29. Orbicular triangular, pale ochreous . 29. *c-nigrum.*
„ not triangular . . . . 30.
30. Orbicular dot-like, dark fuscous . . 12. *cinerea.*
„ not dot-like . . . . 31.

31. Antennae in ♂ pectinated; species very rosy 21. *subrosea.*
,, ,, ciliated . . . . 32.
32. First and second lines black . 22. *Ashworthii.*
,, ,, ,, not black . . . 33.
33. Subbasal line anteriorly black-edged . . 34.
,, ,, not black-edged . . . 38.
34. First line posteriorly black-edged . . 35.
,, ,, ,, not black-edged 30. *ditrapezium.*
35. Forewings suffusedly irrorated with whitish 43. *glareosa.*
,, not irrorated with whitish . . 36.
36. Subterminal line preceded by black costal mark 31. *triangulum.*
,, ,, not preceded by black mark . 37.
37. Forewings rather dark purplish-fuscous 42. *stigmatica.*
,, light ochreous-brown . . 44. *depuncta.*
38. Reniform perceptible . . . . 39.
,, obsolete . . . 23. *lucernea.*
39. Hindwings towards base whitish . . . 40.
,, ,, ,, not whitish . . 42.
40. Forewings with dark suffused costal streak 26. *putris.*
,, without dark costal streak . . 41.
41. Reniform edged with pale yellowish 36. *xanthographa.*
,, not pale-edged . . . 25. *obscura.*
42. Orbicular and reniform pale-edged . 27. *fennica.*
,, ,, not pale-edged . . 43.
43. Median shade dark fuscous . . 38. *umbrosa.*
,, ,, very faint . . . . 44.
44. Lines partially distinctly dark-edged . 24. *simulans.*
,, very faint . . . . . 37. *castanea.*

1. **A. vestigialis,** *Rott.* (*valligera,* Hb.) 31-35 mm. Antennae in ♂ bipectinated. Forewings light ochreous-brownish, much suffused with whitish along veins; veins partly blackish; a short black basal median mark; subbasal, first, and second lines whitish, blackish-edged on costa; spots outlined with black, orbicular narrow-elongate, claviform brown, reniform dark brown, pale-edged; subterminal line whitish, preceded by dark brown wedges. Hindwings whitish; discal spot and terminal suffusion (broader in ♀) fuscous.

Britain to the Hebrides, Ireland, common on coasts; N. and C. Europe; 7, 8. Larva light greenish-grey; dorsal line pale, dark-edged; lateral pale or whitish, dark-edged; tubercular dots black; head light ochreous, dark-marked: on grasses, *Galium, Stellaria,* etc.; 5, 6.

2. **A. corticea,** *Hb.* 34-39 mm. Antennae in ♂ bipectinated. Forewings pale brownish-ochreous or brownish, with darker fuscous strigulae mixed with black scales; subbasal, first, and second lines more or less distinctly edged with dark fuscous; spots blackish-edged, suffused with rather dark brown; subterminal line very faint. Hindwings pale grey, darker towards apex; a darker discal crescentic spot.

Britain to Caledonian Canal, Ireland, common; N., C., and SE. Europe, Asia Minor, N. Asia; 6, 7. Larva rather rough, brownish-grey, darker-freckled; dorsal line pale, dark-edged; subdorsal pale, edged above with dark brown; subspiracular pale, double; head blackish-marked: on *Chenopodium*, *Rumex*, *Trifolium*, etc.; 8-5.

3. **A. segetum,** *Schiff.* 33-41 mm. Antennae in ♂ bipectinated. Forewings brownish, sometimes reddish-tinged, with darker fuscous strigulae mixed with black scales, sometimes wholly darker-suffused; subbasal, first, and second lines edged with dark fuscous, second sometimes with dots only; spots outlined with black, orbicular and reniform centred with fuscous; subterminal line faint or whitish-sprinkled, followed by darker suffusion. Hindwings white, termen brownish.

Britain to Ross, Ireland, very common; Europe, N. and WC. Asia; 6-8. Larva pale grey or greyish-ochreous, sometimes pinkish-tinged; dorsal, subdorsal, and spiracular lines usually indicated by dark edges, subdorsal sometimes grey; head pale, with two brown marks; plate of 2 more or less brown: on roots of *Brassica*, *Rumex*, *Chrysanthemum*, etc.; 7-4.

4. **A. ypsilon,** *Rott.* (*suffusa*, Hb.) 38-48 mm. Antennae in ♂ bipectinated. Forewings brown, reddish-tinged, mixed with pale greyish-ochreous, costa and sometimes median area suffused with dark fuscous; first and second lines edged with dark fuscous; spots outlined with black, reniform followed by a short black dash; subterminal line obscure, usually preceded in middle by two fine black marks. Hindwings whitish-grey or whitish, terminally suffused with fuscous.

Britain to the Shetlands, N. and E. Ireland, common; Europe, N. and WC. Asia, N. America; 8-4. Larva ochreous-brownish or bronzy-grey, sides sometimes greenish; dorsal, subdorsal, and spiracular lines faintly darker or lighter, usually darker-edged; head suffusedly brown-marked: on roots and leaves of *Brassica*, *Lactuca*, *Chenopodium*, etc.; 5-7.

5. **A. lunigera,** *Stph.* 34-40 mm. Antennae in ♂ acutely

dentate. Forewings fuscous, slightly reddish-tinged, more or less sprinkled with dark fuscous, in ♀ darker; first and second lines darker-edged; spots outlined with blackish, orbicular small, whitish, reniform with anterior edge pale, claviform wholly dark fuscous; subterminal line obscure, followed by a darker suffusion. Hindwings in ♂ white, in ♀ fuscous-whitish; a terminal fuscous suffusion.

Britain to Caledonian Canal, E. and S. Ireland, especially on coasts, local; N. France, further range doubtful; 7, 8. Larva dull brownish, on sides greyer, sometimes greenish-tinged; dorsal, subdorsal, and spiracular lines hardly paler, sometimes dark-edged; head brownish, black-marked; plate of 2 blackish, cut by yellowish dorsal line: on *Polygonum*, *Chenopodium*, *Plantago*, etc.; 8-10.

6. **A. exclamationis**, *L.* 34-40 mm. Antennae in ♂ acutely dentate. Forewings light brown, sometimes reddish-tinged; first and second lines darker-edged, sometimes very faint; orbicular and reniform edged with blackish, reniform partly suffused with dark fuscous, claviform wholly black; subterminal line obscurely pale. Hindwings in ♂ white, in ♀ fuscous.

Britain to Ross, Ireland, very common; Europe, N. and WC. Asia; 6-8. Larva pale pinkish-ochreous or brown; dorsal, subdorsal, and spiracular lines more or less dark-edged; spiracles unusually large, black; head pale, with two dark brown marks: on roots and leaves of *Brassica*, *Chenopodium*, *Peucedanum*, etc.; 7-4. This larva, and that of *A. segetum*, are often highly injurious to garden vegetables.

7. **A. obelisca**, *Hb.* 34-38 mm. Antennae in ♂ acutely dentate. Forewings light brown, reddish-tinged; a whitish-ochreous subcostal suffusion towards base; a blackish median dash from base; subbasal, first, and second lines partly blackish-edged; spots outlined with blackish, orbicular and reniform edged with pale or whitish-ochreous, connected by a blackish-fuscous spot, orbicular preceded by a smaller blackish spot; claviform fuscous or dark fuscous; subterminal line obscurely paler. Hindwings fuscous-whitish, with fuscous terminal suffusion.

Britain to Aberdeen, E. and W. Ireland, local; C. and S. Europe; 8. Larva brownish, paler laterally; dorsal, subdorsal, and spiracular lines pale, darker-edged: on *Helianthemum*, *Galium*, etc.; 5, 6.

8. **A. nigricans**, *L.* 33-39 mm. Antennae in ♂ acutely

dentate. Forewings dark fuscous, reddish-tinged, sometimes slightly sprinkled with whitish; subbasal line edged with black marks in middle and on costa; first and second lines sometimes partly blackish-edged; median shade darker; spots partly outlined with black, orbicular preceded and followed by blackish spots, reniform with posterior edge whitish-ochreous; subterminal line forming ochreous-whitish dots. Hindwings fuscous-whitish, with terminal fuscous suffusion.

Britain to Caledonian Canal, Ireland, common; Europe, N. Asia; 7, 8. Larva ochreous or ochreous-brown, sides light grey-greenish; dorsal and subdorsal lines pale grey-greenish, blackish-edged; spiracular blackish-green; subspiracular double, whitish; head blackish-marked: on *Trifolium*, *Plantago*, *Heracleum*, etc.; 4-6.

9. **A. saucia**, *Hb.* 43-50 mm. Antennae in ♂ fasciculate-ciliated. Forewings fuscous, reddish-tinged, sometimes slightly sprinkled with grey-whitish; first and second lines indistinctly darker-edged; spots obscurely outlined with darker, reniform grey, posteriorly edged with grey-whitish; subterminal line obscurely pale. Hindwings whitish, veins and a narrow terminal suffusion dark fuscous.

Britain to the Shetlands, E. Ireland, local, sometimes common, scarce in Ireland; WC. and S. Europe, Asia Minor, N. Africa, N. America; 5, 6, 8-10. Larva reddish-brown, sides paler; dorsal line pale yellowish, dark-edged, interrupted; spiracular pale, black-edged above; a black transverse mark on 12; anal shield pale; head black-marked: on *Rumex*, *Trifolium*, *Stellaria*, etc.; 10-2, 7, 8.

10. **A. praecox**, *L.* 40-44 mm. Antennae in ♂ ciliated. Forewings light grey-greenish, whitish-sprinkled; some white costal dots; first and second lines internally blackish-edged; spots indistinctly outlined with darker, orbicular and reniform ochreous-whitish, brownish-centred, claviform ochreous-whitish mixed with brownish; subterminal line preceded by a red-brown shade not reaching costa. Hindwings light fuscous, darker posteriorly.

Britain to Sutherland, E. and W. Ireland, on coasts, local; C. Europe, N. Asia; 8. Larva pale brown to ferruginous-ochreous, sides greenish or pale grey; dorsal line grey-whitish, dilated to form a series of connected spots, edged with dark spots; subdorsal whitish, dark-edged; subspiracular whitish; head pale brownish, indistinctly dark-marked: on *Salix*, grasses, *Artemisia*, etc.; 5, 6.

11. **A. cursoria**, *Hufn.* 33-37 mm. Antennae in ♂ acutely dentate. Forewings greyish-ochreous or light brownish, sometimes darker in disc; veins partly whitish-marked; first and second lines more or less edged with dark fuscous; spots sometimes partly blackish-outlined, orbicular and reniform edged with pale or whitish, lower end of reniform dark grey; subterminal line partly brown-edged, often followed by dark suffusion. Hindwings whitish; a small discal spot and suffused terminal fascia rather dark grey.

Britain to the Shetlands, Ireland, on coasts, local; C. Europe; 8. Larva pale ochreous, greenish-tinged; dorsal line paler, greenish-edged; subdorsal and spiracular whitish, edged with grey or greenish; head pale ochreous: on grasses, *Arenaria*, *Artemisia*, etc.; 5, 6.

12. **A. cinerea**, *Hb.* 33-37 mm. Antennae in ♂ bipectinated. Forewings fuscous, more or less sprinkled with light grey, in ♀ darker fuscous; subbasal, first, and second lines blackish; median shade darker fuscous; orbicular reduced to a dark fuscous dot; reniform narrow, fuscous, darker-edged; traces of a darker praesubterminal shade. Hindwings in ♂ whitish-fuscous, darker posteriorly, in ♀ fuscous; a darker discal spot.

England to Lancashire, Perth, local; C. and NW. Europe, Asia Minor; 6. Larva dark grey or blackish-green; dorsal and subdorsal lines fine, pale, dark-edged; spiracular dark; head black-marked: on *Thymus*, *Rumex*, etc.; 7-4.

13. **A. ripae**, *Hb.* 35-38 mm. Antennae in ♂ acutely dentate. Forewings greyish-ochreous or ochreous, veins sometimes suffused with white; first and second lines indistinctly edged internally with brownish, externally with black dots; spots outlined with blackish-brown, orbicular and reniform grey-centred, whitish-edged; subterminal line obscurely pale. Hindwings in ♂ white, in ♀ whitish-fuscous.

Britain to Ayr, E. Ireland, on coasts, local; NC. Europe; 6, 7. Larva pale green, yellow-grey or pinkish-whitish; dorsal line dark, double; subdorsal, triple lateral, and spiracular indistinctly darker; head and plate of 2 pale yellow-brown: on *Cynoglossum* and *Salsola;* 8-4.

14. **A. puta**, *Hb.* 29-31 mm. Antennae in ♂ acutely dentate. Forewings pale ochreous, reddish-tinged, in ♀ suffused with fuscous; basal area suffused with reddish-fuscous and dark fuscous except dorsally; first and second lines indistinctly edged internally with brownish, externally with blackish dots;

spots outlined with dark reddish-fuscous, orbicular very elongate, dark-centred, reniform mostly dark reddish-fuscous; subterminal line partly edged with reddish-fuscous suffusion. Hindwings in ♂ white, in ♀ whitish-fuscous.

England to York, N. Ireland, rather common; WC. and S. Europe to Syria, N. Africa; 8, 9. Larva light fuscous, above brownish-ochreous; dorsal line darker, double, traversing a series of freckled spots; subdorsal dark brown, finely pale-edged beneath; head and plate of 2 brown, darker-marked: on *Polygonum*, *Taraxacum*, *Lactuca*, etc.; 9-4.

15. **A. plecta**, *L.* 27-29 mm. Antennae in ♂ serrate. Forewings purplish-brown; a broad ochreous-whitish costal suffusion from base to beyond middle, edged beneath by a suffused blackish streak; orbicular and reniform small, fuscous, whitish-edged. Hindwings white, with a few grey scales towards apex.

Britain to Sutherland, Ireland, common; N. and C. Europe, Asia Minor, N. America; 6. Larva pale ochreous, pale brown, or reddish-brown, darker-freckled, with numerous dark fuscous dots; dorsal and subdorsal lines slender, whitish, interrupted, dark-edged; spiracular broad, ochreous-whitish, brown-dotted; head brown, dark-marked: on *Galium*, *Atriplex*, *Rumex*, etc.; 7, 8.

16. **A. strigula**, *Thnb.* (*porphyrea*, Hb.) 23-31 mm. Antennae in ♂ serrate. Forewings brown-reddish mixed with dark fuscous and on veins with whitish; a submedian black basal dash; first and second lines grey-whitish, internally blackish-edged; spots outlined with black, orbicular small, white, reniform whitish-edged; subterminal line obscurely grey-whitish, edged anteriorly with suffused blackish spots. Hindwings fuscous, darker posteriorly.

Britain to the Shetlands, Ireland, on heaths, common; N. and C. Europe; 6, 7. Larva ochreous or pinkish-brown, sometimes darker-irrorated; dorsal line interrupted, whitish, edged with dark fuscous marks; subdorsal similar, less marked; spiracular pinkish-whitish, dark-edged above; head pale yellow-brown, darker-marked: on *Calluna* and *Erica*; 9-5.

17. **A. agathina**, *Dup.* 27-35 mm. Antennae in ♂ serrate. Forewings light fuscous, reddish-tinged, whitish-sprinkled; costa rather broadly suffused with whitish to beyond middle; a fine blackish median basal dash; subbasal, first, and second lines obscurely blackish; spots outlined with black, orbicular white, placed on a blackish streak reaching from first line to whitish-

edged reniform, claviform ending in a black mark; subterminal line preceded by blackish spots, forming a whitish tornal spot. Hindwings whitish-fuscous, with darker discal spot and postmedian line.

Britain to the Orkneys, N. and E. Ireland, on heaths, local; WC. Europe; 8. Larva green or pinkish-brown, darker-irrorated; dorsal line whitish, dark-edged; subdorsal whitish, blackish-edged above; spiracular broader, ochreous-whitish, sometimes dark-edged above; head pale yellow-brown, darker-marked: on *Calluna* and *Erica;* 9-6.

18. **A. tritici**, *L.* (*aquilina*, Hb.) 29-37 mm. Antennae in ♂ serrate. Forewings brown, sometimes pale-mixed or reddish-tinged, veins sometimes black, sometimes with a whitish subcostal streak; sometimes an irregular black median basal dash; median vein whitish; first and second lines pale, dark-edged; spots outlined with black, orbicular and reniform edged with pale or whitish, space between them often darker; subterminal line pale, preceded by dark or black wedges in disc. Hindwings white or whitish, posteriorly more or less fuscous-tinged or suffused.

Britain to the Orkneys, Ireland, common, especially on coasts; N. and C. Europe, NW. and WC. Asia to Turkestan; 7, 8. Larva dull brownish; dorsal line pale; subdorsal fuscous, dark, pale-edged beneath; lateral and spiracular dark greenish-fuscous; head brownish, dark-marked: on *Plantago*, *Stellaria*, *Brassica*, etc.; 5, 6.

19. **A. augur**, *F.* 38-43 mm. Antennae in ♂ ciliated. Forewings fuscous, slightly reddish-tinged; first and second lines internally blackish-edged; spots more or less outlined with black; subterminal line very faint. Hindwings fuscous, lighter anteriorly.

Britain to the Orkneys, Ireland, common; N. and C. Europe, NW. Asia; 6, 7. Larva purple-brownish or grey-greenish; a double dorsal series of whitish dots and oblique darker marks; spiracular line dark brown; on 12 a dark brown transverse mark dilated at extremities, pale-edged posteriorly; head pale brown: on hawthorn, *Salix*, *Rumex*, etc.; 8-5. *A. helvetina*, B., was erroneously recorded as British from a bleached example of this species.

20. **A. occulta**, *L.* 50-58 mm. Antennae in ♂ ciliated. Forewings fuscous, mixed and partly suffused with dark fuscous, veins and margins whitish-sprinkled; subbasal, first, and second lines dentate, whitish; spots outlined with blackish, orbicular

whitish, claviform pale or whitish, reniform darker-marked; subterminal line hardly paler, edged anteriorly with dark fuscous. Hindwings rather dark fuscous; cilia white.

Britain (except WC. and SW. England) to the Shetlands, local, commoner northwards; N. and EC. Europe, N. Asia, N. America; 7, 8. Larva brown, darker-irrorated; dorsal and subdorsal lines pale yellowish, latter including a series of oblique dark marks; spiracular whitish; dots pale yellowish; head brown: on *Primula*, *Taraxacum*, etc.; 9-5.

21. **A. subrosea**, *Stph.* 37-41 mm. Antennae in ♂ bipectinated. Face blackish-fuscous. Forewings rosy-ochreous or pale rosy-grey, sprinkled with dark brown-reddish or rosy-fuscous; subbasal, first, and second lines waved, dark reddish-fuscous; orbicular and reniform pale-edged, partly blackish-outlined, a quadrate spot between them and a spot before orbicular darker reddish-brown, partly marked with dark fuscous; subterminal line anteriorly indistinctly darker-edged. Hindwings fuscous-whitish or pale fuscous-yellowish; discal spot and subterminal fascia fuscous.

Cambridge, Hunts, in fens, formerly not scarce, now many years extinct; NW. Russia; 7, 8. Larva rosy-grey or purplish-grey; dorsal and subdorsal lines pale; spiracular bright yellow; head and plate of 2 reddish-brown: on *Myrica*, *Salix*, and *Andromeda*; 9-5.

22. **A. Ashworthii**, *Dbld.* (*candelarum*, Stgr.) 35-40 mm. Antennae in ♂ ciliated. Forewings pale fuscous, very densely irrorated with violet-whitish, especially towards costa; subbasal, first, and second lines fine, blackish, second sharply dentate; orbicular and reniform faint, sometimes pale-edged, sometimes connected by a dark spot; median shade and sometimes subterminal darker. Hindwings grey, darker posteriorly.

Merioneth, Denbigh, Caernarvon, in mountainous districts, local; C. Europe; 7, 8. Larva dull dark grey-green, blackish-grey, or fuscous; subdorsal series of narrow rectangular black marks; head red-brown: on *Helianthemum*, *Hieracium*, *Salix*, etc.; 9-5.

23. **A. lucernea**, *L.* 35-45 mm. Antennae in ♂ ciliated. Forewings grey, faintly greenish-tinged, pale-sprinkled; subbasal, first, and second lines edged with dark grey; median shade dark grey; subterminal line margined anteriorly or sometimes wholly obscured with dark grey suffusion. Hindwings fuscous, becoming dark fuscous posteriorly; cilia white, base pale brown.

Britain to the Shetlands, Ireland, especially near coasts, local; N. and mountains of C. Europe; 7. Larva fuscous; subdorsal series of dark fuscous arrow-heads, terminated posteriorly by pale spots; head fuscous, black-marked: on *Sedum*, *Stellaria*, *Campanula*, etc.; 9-4.

24. **A. simulans**, *Hufn.* (*pyrophila*, F.) 40-42 mm. Antennae in ♂ ciliated. Forewings light fuscous, slightly ochreous-tinged; subbasal, first, and second lines edged with dark fuscous marks or dots; orbicular and reniform partly outlined with dark fuscous, reniform obscurely darker-marked; median shade very faint; subterminal line edged anteriorly with dark fuscous shade. Hindwings fuscous; cilia whitish, base whitish-ochreous.

Britain to the Orkneys, N. Ireland, local; Europe, NW. and WC. Asia to Turkestan; 7. Larva said to be fuscous: on grasses and low plants; 8-5 (?).

25. **A. obscura**, *Brh.* (*ravida*, Hb.) 41-44 mm. Antennae in ♂ ciliated. Forewings fuscous, towards costa rosy-tinged; an obscure blackish median dash from base; subbasal, first, and second lines slightly paler, obscurely darker-edged, distinct on costa; orbicular and reniform partly outlined with black, sometimes connected by a blackish mark or touching, orbicular rather elongate; subterminal line pale, anteriorly with somewhat darker suffusion. Hindwings fuscous-whitish, darker posteriorly.

Britain to the Clyde, local; N. and C. Europe, N. Asia; 7. Larva ochreous-brown; dorsal line somewhat paler; subdorsal series of curved or sometimes nearly straight oblique yellowish marks, edged above with dark fuscous; head grey, fuscous-marked: on *Taraxacum*, *Stellaria*, etc.; 9-5.

26. **A. putris**, *L.* 29-33 mm. Antennae in ♂ ciliated. Forewings whitish-ochreous, somewhat mixed with darker ochreous; an irregular suffused dark fuscous costal streak from base to apex, partly reddish, broadest beyond middle; edges of first line marked with some blackish scales, strongly dentate, of second with black dots; interiors of orbicular and reniform dark fuscous, touching costal streak; a dark fuscous terminal wedge below apex. Hindwings grey-whitish, termen interruptedly dark fuscous.

Britain to Ross, Ireland, common; C. Europe, NW. Asia; 6. Larva pale brown, darker-irrorated; dorsal line pale, interrupted; subdorsal series of dark greenish-fuscous oblique marks, especially distinct on 5, 6, 10, 11, edged beneath with pale ochreous; a pale ochreous bar on 12; spiracular pale, pinkish or yellowish-tinged; head brown, darker-marked: on *Stellaria*, *Atriplex*, *Plantago*, etc.; 7, 8.

27. **A. fennica,** *Tausch.* 38-43 mm. Antennae in ♂ ciliated. Forewings rather narrow, in ♂ ochreous-brown, becoming broadly light ochreous towards dorsum, in ♀ uniform rather dark ashy-grey; subbasal, first, and second lines faintly darker-edged; orbicular and reniform suffusedly edged with whitish. Hindwings pale fuscous, darker terminally.

Derby, once, probably a casual immigrant only; NE. Europe, N. Asia, N. America; 7, 8. Larva on *Epilobium*, *Corydalis*, etc.; 9-5.

28. **A. flammatra,** *F.* 43-48 mm. Antennae in ♂ ciliated. Posterior half of collar dark fuscous. Forewings brown, reddish-tinged, on costa anteriorly broadly paler; a blackish-fuscous basal median dash terminating in an oval spot; subbasal, first, and second lines paler, darker-edged; orbicular and margin of reniform pale, a quadrate spot between them and wedge before orbicular blackish-fuscous; dark margin of claviform partly indicated; subterminal line edged anteriorly with dark fuscous marks. Hindwings fuscous, paler or whitish towards base.

Isle of Wight, Norfolk, a casual only; SC. and S. Europe, Asia Minor; 7. Larva said to be green, with pale subspiracular line: on low plants; 9-5.

29. **A. c-nigrum,** *L.* 34-39 mm. Antennae in ♂ ciliated. Collar anteriorly pale greyish-ochreous. Forewings brown, tinged with purplish or reddish; subbasal, first, and second lines pale, partly dark-edged; a dark fuscous suffused patch extending from first line to reniform; orbicular triangular, pale ochreous, extending as a broad suffusion to costa; reniform with edges and central mark pale; subterminal line obscure, preceded on costa by a blackish mark. Hindwings fuscous-whitish, termen suffused with fuscous.

Britain to the Shetlands, Ireland, common; C. Europe, N. Asia, N. America; 6-8. Larva light brownish or greenish-grey; dorsal line slightly paler; subdorsal series of blackish marks, obsolete anteriorly; indistinct oblique lateral darker marks; subspiracular line broad, pale yellow-ochreous or whitish-ochreous; head pale brownish, dark-marked: on *Rumex*, *Stellaria*, *Primula*, etc.; 8-4.

30. **A. ditrapezium,** *Bkh.* 38-43 mm. Antennae in ♂ ciliated. Collar with a pale transverse line. Forewings brown, tinged with purplish or reddish; subbasal line pale yellowish,

anteriorly blackish-edged; first and second somewhat paler, darker-edged; a dark fuscous patch extending from first to reniform; orbicular and reniform suffused with purplish-grey, orbicular narrowed beneath; subterminal line obscure, preceded on costa by a blackish mark. Hindwings pale yellowish-fuscous, darker terminally.

Kent to Cornwall, Norfolk, York, W. Ireland, local; C. Europe, N. Asia; 7. Larva dull pinkish-ochreous, blackish-speckled; dorsal line pale, obscure; subdorsal series of dark marks on posterior segments, on 12 blackish and sometimes connected, followed by a pale bar; subspiracular line pale; head ochreous, brown-marked: on *Rumex*, *Rubus*, *Salix*, etc.; 8-5.

31. **A. triangulum**, *Hufn.* 38-42 mm. Antennae in ♂ ciliated. Collar anteriorly pale greyish-ochreous, with whitish transverse line. Forewings light purplish-brown, suffusedly irrorated with pale ochreous; subbasal line whitish, anteriorly black-edged; first whitish, posteriorly black-edged; orbicular and reniform pale-edged, former narrowed beneath, a quadrate spot between them and triangular spot before orbicular dark fuscous; second line dark-edged; subterminal obscure, preceded on costa by a blackish mark. Hindwings fuscous.

Britain to Ross, Ireland, common; C. and SE. Europe; 6, 7. Larva ochreous or brown, blackish-speckled; dorsal line pale; subdorsal series of oblique dark marks on 5-12, darker on 12 and connected, followed by a pale bar; subspiracular line pale ochreous; head pale brown, blackish-marked: on *Rumex*, *Stellaria*, *Salix*, etc.; 8-5.

32. **A. pronuba**, *L.* 48-56 mm. Antennae in ♂ ciliated. Forewings ochreous-brown to dark fuscous, sometimes reddish-tinged, sometimes partly irrorated with grey-whitish, especially towards costa anteriorly; lines often paler, dark-edged, sometimes faint, subterminal preceded on costa by a blackish mark; orbicular and reniform more or less pale-edged, outlined with darker, reniform partly marked with dark grey. Hindwings ochreous-orange; a blackish terminal band.

Britain to the Shetlands, Ireland, very plentiful; Europe, NW. and WC. Asia, N. Africa; 6, 7. Larva pale green to dull brown; dorsal line pale; subdorsal series of blackish longitudinal marks on 5-12; a pale line beneath these; subspiracular pale; head light brown, dark-marked: on *Brassica*, *Taraxacum*, *Rumex*, etc.; 9-5.

33. **A. comes**, *Hb.* (*orbona*, F.) 38-45 mm. Antennae in ♂ ciliated. Forewings light fuscous or reddish-brown to dark

fuscous, sometimes partly irrorated with pale greyish-ochreous; lines somewhat paler, indistinctly darker-edged; orbicular and reniform usually darker, pale-edged. Hindwings ochreous-orange, base sometimes infuscated; a crescentic discal mark and terminal band blackish.

Britain to the Orkneys, Ireland, very common; C. and S. Europe, Asia Minor, N. Africa; 7, 8. Larva pale greyish-ochreous to brown; dorsal line faint; subdorsal dark brown longitudinal marks on 11 and 12, pale-edged beneath, tending to connect on 12; usually a spiracular series of dark brown oblique marks; subspiracular line pale, sometimes pinkish-tinged; head light brown, darker-marked: on *Stellaria*, *Salix*, *Rubus*, *Rumex*, etc.; 9-5.

34. **A. orbona**, *Hufn.* (*subsequa*, Hb.) 37-41 mm. Differs from *A. comes* as follows: forewings with subterminal line preceded on costa by a black mark.

Britain to the Shetlands, N. and W. Ireland, local and uncommon; Europe, Asia Minor; 7, 8. Larva greyish-ochreous or fuscous; dorsal line broad, ochreous-yellow, finely black-edged; subdorsal series of dark fuscous oblong marks; beneath these a pale grey-yellowish line; lateral pale; subspiracular broad, pale ochreous, dark-edged; head pale fuscous, dark-marked: on grasses, *Ranunculus*, *Primula*, etc.; 9-4.

35. **A. brunnea,** *F.* 35-40 mm. Antennae in ♂ ciliated. Forewings reddish-brown, with a purple gloss; subbasal, first, and second lines darker-margined, median darker; spots outlined laterally with black, reniform more or less suffused with pale ochreous-yellowish; a dark quadrate spot between orbicular and reniform; subterminal line preceded by a dark suffusion, especially towards costa. Hindwings fuscous; cilia light-reddish.

Britain to Sutherland, Ireland, common; N. and C. Europe, NW. Asia; 6, 7. Larva brown or reddish-brown; dorsal line pale or whitish-ochreous, dark-edged; subdorsal series of oblique darker marks; lateral line pale yellowish, sometimes interrupted; spiracular sometimes darker; subspiracular flesh-colour; a pale yellowish bar on 12; head pale brown, dark-marked: on *Salix*, *Rubus*, *Rumex*, etc.; 9-4.

36. **A. xanthographa**, *F.* 34-38 mm. Antennae in ♂ ciliated. Forewings fuscous or pale fuscous, more or less strongly reddish-tinged; subbasal, first, and second lines fine, dark fuscous, sometimes obsolete, second dotted; median sometimes darker; orbicular and reniform outlined with dark fuscous and

edged with pale yellowish, reniform often with pale central mark; subterminal line hardly paler, anteriorly suffusedly dark-edged. Hindwings whitish, in ♂ with fuscous terminal band, in ♀ posteriorly suffused with fuscous.

Britain to the Shetlands, Ireland, very common; C. and S. Europe; 8. Larva light brownish-ochreous, sometimes reddish-tinged; dorsal line pale, dark-edged; subdorsal pale, dark-edged beneath, edged above by a series of dark fuscous marks, nearly obsolete on 2-4; spiracular brown; head ochreous, brown-marked: on grasses, *Rumex*, *Plantago*, etc.; 9-5.

37. **A. castanea**, *Esp.* (*neglecta*, Hb.) 35-40 mm. Antennae in ♂ ciliated. Forewings ochreous-grey, reddish-grey, or reddish-fuscous; lines very faint; orbicular and reniform faintly outlined, lower end of reniform darker. Hindwings fuscous.

Britain to the Orkneys, N. and W. Ireland, on heaths, common; WC. Europe to Germany and N. Italy; 8. Larva pale green or dull brown, darker-sprinkled; dorsal and subdorsal lines pale; spiracular broad, whitish; head brown or greenish: on *Calluna;* 10-5.

38. **A. umbrosa**, *Hb.* 35-37 mm. Antennae in ♂ ciliated. Forewings light red-brownish, sprinkled with dark fuscous; veins dark fuscous; subbasal, first, and second lines, median and subterminal shades dark fuscous; orbicular and reniform outlined with dark fuscous. Hindwings fuscous, paler anteriorly.

Britain to Ross, Ireland, rather common; WC. Europe; 7, 8. Larva pale ochreous or brownish, darker-striated; dorsal line ochreous-whitish, edged with dark-brown; subdorsal ochreous-whitish, edged above by a series of blackish dashes or wedges; spiracular dark brown; head pale brown, darker-marked: on *Rumex*, *Rubus*, *Plantago*, etc.; 8-5.

39. **A. rubi**, *View.* (*bella*, Bkh.) 32-35 mm. Antennae in ♂ ciliated. Forewings reddish-fuscous; subbasal, first, and second lines distinctly margined with darker fuscous; median shade darker; orbicular and reniform obscurely edged with ochreous-grey-whitish; claviform represented by a dark fuscous dot; subterminal line darker-edged posteriorly. Hindwings pale fuscous, darker terminally.

Britain to the Orkneys, Ireland, common; C. Europe; 5, 6, 8. Larva greyish-ochreous, grey, or brown; dorsal and subdorsal lines pale, dark-edged; subspiracular conspicuously pale; head brown, darker-marked: on grasses, *Rumex*, *Taraxacum*, etc.; 6, 7, 9-3.

40. **A. Dahlii,** *Hb.* 33-38 mm. Antennae in ♂ ciliated. Forewings reddish-brown, with purplish gloss; subbasal, first, and second lines darker-edged; median shade darker; orbicular and reniform more or less edged with ochreous-whitish; claviform represented by a black dot; subterminal line usually pale ochreous-yellowish, darker-edged. Hindwings fuscous, darker posteriorly.

Britain to the Orkneys, Ireland, local; C. Europe, NW. Asia; 6, 7. Larva greyish-ochreous to dull green, dorsal area whitish-ochreous to deep brown, markedly contrasting; dorsal line pale, dark-edged, interrupted, traversing series of darker diamonds; subdorsal pale, edged above with series of black dashes; subspiracular pale; head pale brown; plate of 2 darker brown: on *Rumex*, *Primula*, *Plantago*, etc.; 9-5.

41. **A. festiva,** *Hb.* (*conflua*, Tr.) 27-36 mm. Antennae in ♂ ciliated. Forewings pale ochreous or pale brown, often reddish-tinged; lines somewhat paler, darker-edged, median shade reddish-fuscous; a blackish dot in disc before first line; orbicular and reniform darker-outlined, usually pale-edged or sometimes wholly pale; claviform represented by a blackish dot; a reddish-fuscous fascia before subterminal line. Hindwings light fuscous, darker posteriorly.

Britain to the Shetlands, Ireland, plentiful; N. and C. Europe, NW. Asia, N. America; 6, 7. Larva pale ochreous or grey-greenish to purplish-brown; dorsal line pale, dark-edged, indistinct; subdorsal pale or whitish, edged above with a series of thick dark or blackish marks; sometimes a lateral series of oblique darker marks; subspiracular pale; head brown, dark-marked: on *Rumex*, *Rubus*, *Salix*, etc.; 8-5. The name *conflua* was given to the small northern and alpine form.

42. **A. stigmatica,** *Hb.* (*rhomboidea*, Tr.) 36-43 mm. Antennae in ♂ ciliated. Forewings rather dark fuscous, purplish-tinged; subbasal line anteriorly black-edged; first line strongly black-edged posteriorly except towards dorsum; median shade indistinctly darker, angulated; orbicular and reniform finely edged with pale yellowish, separated and orbicular preceded by quadrate darker spots; subterminal line obscurely pale yellowish, anteriorly edged with dark suffusion. Hindwings dark fuscous-grey.

Britain to the Clyde, common; C. Europe; 6, 7. Larva reddish-brown or deep brown; dorsal and subdorsal lines pale ochreous or greenish, sometimes indistinct, subdorsal usually edged above by dark wedges on 9-12; subspiracular pale ochreous; a pale bar on 12: head brown, darker-marked: on *Rumex*, *Primula*, *Stellaria*, etc.; 9-5.

43. **A. glareosa**, *Esp.* 33-38 mm. Antennae in ♂ ciliated. Forewings pale brown, suffusedly irrorated with whitish; subbasal line anteriorly black-edged; first line black-edged posteriorly except towards dorsum; second paler, darker-edged; orbicular and reniform indistinct, separated and orbicular preceded by triangular dark-brown spots. Hindwings fuscous-whitish, more fuscous terminally, in ♀ more infuscated. A race occurring in the Shetlands has the forewings suffused with dark fuscous.

Britain to the Shetlands, Ireland, rather local, commoner northwards; WC. Europe; 8, 9. Larva light brown, sides darker-freckled; dorsal and subdorsal lines pale, dark-edged; spiracular pale ochreous; head pale brownish, dark-marked: on *Cytisus*, *Rumex*, *Stellaria*, etc.; 9-6.

44. **A. depuncta**, *L.* 35-38 mm. Antennae in ♂ ciliated. Forewings light ochreous-brown; subbasal line anteriorly black-edged; first line black-edged posteriorly except towards dorsum; second partly dark-edged, on costa anteriorly blackish-edged; orbicular and reniform finely pale-edged, space between them and before orbicular browner; subterminal line anteriorly darker-edged. Hindwings fuscous, darker posteriorly.

Britain to Caledonian Canal (except SE. England), local; C. Europe; 7, 8. Larva dull brown; a dorsal series of diamonds darker-outlined; spiracular suffusedly darker, spiracles white, dark-edged; subspiracular ochreous-whitish; head light brown, darker-marked: on *Primula*, *Urtica*, *Rumex*, etc.; 9-5.

45. **A. typica**, *L.* 35-40 mm. Antennae in ♂ ciliated. Forewings brown mixed with dark fuscous; veins marked with whitish lines; subbasal, first, second, and subterminal lines whitish, edged with dark fuscous, orbicular and reniform outlined with dark fuscous and edged with whitish, reniform with whitish central line, space between them darker; claviform sometimes indicated; a terminal series of crescentic dark fuscous marks. Hindwings dark fuscous-grey.

Britain to Sutherland, Ireland, common; N., C., and SW. Europe, N. and WC. Asia; 6, 7. Larva pale greyish-ochreous, brown-freckled; subdorsal blackish marks on 11 and 12, latter connected posteriorly; a lateral series of indistinct pale oblique marks; spiracular line pale, blackish-edged above; head greyish-ochreous, brown-marked: on *Rumex*, *Sonchus*, apple, etc.; 8-4.

21. TRIPHAENA, *O.*

Head rough-scaled; eyes glabrous. Antennae in ♂ ciliated, or bipectinated with apex simple. Thorax usually with more or less developed anterior and posterior crests. Abdomen not crested. Middle and posterior tibiae spinose.

Nearly correlated to the preceding genus, but much less extensive, and apparently restricted to the northern hemisphere.

1. Hindwings orange . . . . 2.
,, not orange . . . . 4.
2. Hindwings with base dark fuscous . . 3.
,, ,, base not dark fuscous . 1. *fimbria.*
3. Forewings with crimson costal praesubterminal blotch . . . 2. *ianthina.*
,, without such blotch . 3. *interjecta.*
4. Forewings greenish . . . 9. *prasina.*
,, not greenish . . . . 5.
5. Subterminal line preceded by black subcostal spots 4. *baja.*
,, ,, not preceded by black spots . 6.
6. Hindwings whitish . . 7. *leucographa.*
,, not whitish . . . . 7.
7. Orbicular suffused with whitish . . 8. *hyperborea.*
,, not whitish . . . . 8.
8. Head dark ferruginous-reddish . . 5. *sobrina.*
,, not dark ferruginous-reddish . 6. *rubricosa.*

1. **T. fimbria**, *L.* 50-57 mm. Antennae in ♂ ciliated. Forewings rather narrow, ochreous-brown, variably tinged with reddish or greenish or partially suffused with whitish-ochreous; subbasal and first lines dark; orbicular and reniform approximated, edged with ochreous-whitish; second line whitish-ochreous, preceded by a dark and followed by a pale band; subterminal pale, preceded on costa by a dark blotch enclosing a black mark. Hindwings bright orange, with a very broad black terminal band.

Britain to Ross, Ireland, common; C. and S. Europe, Asia Minor; 7, 8. Larva reddish-ochreous, brown-dotted, becoming paler laterally; dorsal line obscurely pale; a dark posteriorly pale-edged bar on 12; spiracles pale, placed in dark spots; head brown, darker-reticulated: on birch, *Salix*, hawthorn, *Rumex*, etc.; 9-5.

2. **T. ianthina**, *Esp.* 35-41 mm. Antennae in ♂ ciliated. Forewings rather dark brown, more or less tinged with purple-

reddish, towards costa irrorated with ashy-whitish; first and second lines and median shade darker fuscous; orbicular and reniform sometimes partly edged with grey-whitish, usually indistinct; subterminal line usually indistinct, preceded on costa by a fuscous-crimson blotch. Hindwings orange; base broadly suffused with dark fuscous; a broad black terminal fascia.

Britain to Ross, Ireland, common; C. and S. Europe; Asia Minor; 7, 8. Larva pale greenish or ochreous, blackish-dotted; dorsal line pale, partly edged with short dark marks; two blackish spots on 12; sometimes a lateral series of oblique darker marks; subspiracular line pale; head pale, darker-marked: on *Primula*, *Stellaria*, *Rubus*, etc.; 9-5.

3. **T. interjecta**, *Hb.* 30-33 mm. Antennae in ♂ ciliated. Forewings ochreous-reddish-brown; first and second lines darker-edged; median shade fuscous; orbicular and reniform sometimes outlined with darker, usually indistinct; subterminal line preceded by a fuscous suffusion. Hindwings orange, towards base irregularly suffused with dark fuscous; a rather broad black terminal fascia.

England to York, Ireland, common; WC. Europe; 7. Larva pale ochreous; dorsal and subdorsal lines whitish, brown-edged; spiracular pale; dots black; head pale ochreous, dark-marked: on grasses, *Primula*, *Rumex*, etc.; 9-5.

4. **T. baja**, *F.* 37-40 mm. Antennae in ♂ ciliated. Forewings light reddish-brown, ochreous-tinged; a blackish dot in disc before first line; first and second lines indistinctly dark-margined, median shade darker; orbicular and reniform outlined with darker, edged with whitish-ochreous, reniform grey beneath; subterminal line obscure, preceded beneath costa by two small black spots. Hindwings pale yellowish-fuscous, darker posteriorly.

Britain to Ross, Ireland, common; N. and C. Europe, NW. Asia, N. America; 7. Larva grey, brown, or brown-reddish; dorsal and subdorsal lines pale, between them a series of oblique dark marks; spiracular pale; a pale bar on 12; head pale brownish, darker-marked: on *Salix*, hawthorn, birch, *Primula*, etc.; 9-5.

5. **T. sobrina**, *Gn.* 33-38 mm. Antennae in ♂ shortly ciliated. Head deep ferruginous-reddish. Forewings rather dark purplish-brown; lines very indistinctly darker-margined, median shade faintly darker; orbicular and reniform indistinctly outlined with darker, lower end of reniform darker; subter-

minal line somewhat paler. Hindwings light fuscous, darker terminally.

Perth to Aberdeen, local; N. and C. Europe, NW. Asia; 7. Larva brown-reddish; sides grey-freckled; dorsal and subspiracular lines pale; dots minute, black; head brownish-ochreous: on birch and *Calluna;* 9-6.

6. **T. rubricosa**, *F.* 31-35 mm. Antennae in ♂ serrate, ciliated. Forewings reddish-fuscous, much suffused with purplish-grey; lines somewhat lighter, obscurely darker-edged, more strongly on costa; median shade darker; orbicular and reniform darker-outlined, lower end of reniform dark grey. Hindwings fuscous, darker terminally.

Britain to the Orkneys, N. and E. Ireland, common; N. and C. Europe, N. Asia; 3, 4. Larva pinkish-brown, with suffused darker median segmental bands; dorsal line obscurely paler; subdorsal narrow, interrupted, pale yellow; spiracular pale brownish, anteriorly yellow; head pinkish-brown, darker-marked: on *Rumex*, *Plantago*, *Stellaria*, etc.; 4-6.

7. **T. leucographa**, *Hb.* 33-36 mm. Antennae in ♂ bipectinated. Forewings reddish-brown, median and terminal areas darker; veins somewhat whitish-sprinkled; lines more or less whitish-sprinkled, obscurely darker-edged; median shade somewhat darker; orbicular and reniform edged with whitish-ochreous irroration. Hindwings whitish, tinged with reddish-fuscous.

England, local; C. Europe; 3, 4. Larva pale green or reddish-ochreous, darker-irrorated: dorsal and sometimes subdorsal lines pale; sometimes a lateral series of dark oblique streaks; spiracular line pale greenish or whitish; head greenish: on *Salix*, *Rumex*, *Plantago*, etc.; 5-7.

8. **T. hyperborea**, *Zett.* (*carnica*, Hering; *alpina*, Stt.) 35-40 mm. Antennae in ♂ bipectinated. Forewings light brownish, more or less reddish, irregularly and suffusedly irrorated with whitish; subbasal, first, and second lines pale, dark-edged; spots edged with dark fuscous, orbicular and reniform large, orbicular whitish-suffused, reniform more brownish or ferruginous; median shade darker. Hindwings light fuscous, darker terminally.

Perth to the Shetlands, at high elevations, scarce and local; mountains of N. and C. Europe; 7, 8. Larva deep brown-red; dorsal diamonds of blackish freckles; subdorsal line light greyish-ochreous, partially blackish-edged above; subspiracular obscurely pale; head brown: on *Empetrum*, *Arbutus*, and *Vaccinium;* 8-6.

9. **T. prasina**, *F.* (*herbida*, Hb.) 42-50 mm. Antennae in ♂ ciliated. Forewings olive-green, sprinkled with blackish; veins mixed irregularly with whitish and blackish; subbasal, first, and second lines pale, blackish-edged; median shade blackish-mixed; spots outlined with black, orbicular brownish, reniform mostly suffused with dark fuscous, followed by a pale suffusion; subterminal line pale. Hindwings fuscous, darker posteriorly.

Britain to Ross, Ireland, common; C. Europe, N. Asia, N. America; 6, 7. Larva violet-brown, with double series of darker blotches above; dorsal line pale; spiracular pale, dark-edged above; head pale reddish-brown, darker-marked: on *Rumex*, birch, *Rubus*, etc.; 8-4.

22. Heliothis, *O.*

Head rough-scaled; eyes glabrous. Antennae in ♂ ciliated. Thorax without crest. Abdomen not crested. Tibiae spinose, anterior tibiae with horny apical hook.

A rather small genus, but very generally distributed, though commoner in subtropical regions; it is a development of *Caradrina;* some of the species have a very wide natural range. The larvae feed especially on the blossoms of their food-plants.

1. Hindwings with broad discal spot . . 2.
,, without such spot . . . 3.
2. Hindwings with postmedian dark fuscous line 3. *scutosa.*
,, without postmedian line . 4. *dipsacea.*
3. Forewings with terminal black dot above tornus . 2. *peltigera.*
,, without such dot . . 1. *armigera.*

1. **H. armigera**, *Hb.* 30-40 mm. Forewings pale brownish-ochreous or yellow-ochreous, sometimes suffused with brown or rosy; first and second lines edged with darker or ferruginous, median darker or ferruginous; orbicular and reniform darker-outlined, often indistinctly, a dot in orbicular and interior spot in reniform dark grey; subterminal line obscure. Hindwings fuscous-whitish, veins dark fuscous; a broad blackish terminal band.

England, local and irregular; C. and S. Europe, C. and S. Asia, Africa, America, Australia; 9, 10. Larva pale brown to green, darker-freckled; dorsal line pale, darker-edged; spiracular whitish or yellow; head brown: on rose, *Reseda*, *Calamintha*, etc.; 6, 7.

2. **H. peltigera**, *Schiff.* 31-35 mm. Forewings light brownish-

ochreous; first, median, and second lines ferruginous-brownish, second followed by white dots; orbicular represented by a dark dot; reniform ochreous-brown, suffused with dark grey, connected with costa by an ochreous-brown suffusion; subterminal line pale, preceded on costa by an ochreous-brown spot; a black terminal dot above tornus. Hindwings fuscous-whitish, veins dark fuscous; a broad dark fuscous terminal band.

Britain to Ayr, local and irregular; C. and S. Europe, WC. Asia to Turkestan and NW. India, Africa; 5-9. Larva green or ochreous-reddish, with white dots; dorsal and subdorsal lines darker; spiracular white; head green or brownish: on *Ononis*, *Pyrethrum*, *Arenaria*, etc.; 5-8.

3. **H. scutosa**, *Schiff.* 30-35 mm. Forewings light brown mixed with dark fuscous, becoming whitish in disc, veins whitish; first and second lines pale, darker-edged; spots large, dark brown, black-outlined; subterminal line whitish, anteriorly partly dark-edged. Hindwings fuscous-whitish; veins, a large transverse discal spot, a postmedian line, and a terminal band including two whitish spots dark fuscous.

England, N. Ireland, probably a casual immigrant only; C. Europe, NW. and C. Asia, N. America; 6, 8, 9. Larva green; dorsal and spiracular lines yellow, blackish-edged; subdorsal blackish-freckled; head green: on *Artemisia*; 7.

4. **H. dipsacea**, *L.* 30-33 mm. Forewings greyish-ochreous, slightly greenish-tinged, paler before and beyond reniform; first and second lines indistinct; median shade rather dark fuscous, confluent with large dark fuscous reniform; subterminal line rather paler, preceded by a darker or fuscous fascia, darkest at extremities. Hindwings ochreous-whitish, towards base suffused with blackish; a large discal spot, and terminal band including an ochreous-whitish spot blackish.

England to York, local; Europe, N. and C. Asia, N. Africa, N. America; 6, 7. Larva green to purplish-brown; dorsal line darker-edged; subdorsal whitish, dark-edged beneath; spiracular green or yellowish; subspiracular white; head green, pink, or yellowish, brown-speckled: on *Linaria*, *Centaurea*, *Ononis*, etc.; 8, 9.

23. OCHRIA, *Hb.*

Head with projecting triangular horny frontal plate, concealed in dense scales; eyes glabrous. Antennae in ♂ ciliated. Thorax with anterior and posterior crests. Abdomen not crested.

Includes two other N. American species only; it is correlated with *Nonagria.*

1. **O. ochracea,** *Hb.* (*flavago,* Esp.) 31-40 mm. Forewings ochreous-yellow, irrorated with ferruginous; subbasal, first, and second lines ferruginous-margined, first preceded and second followed by ferruginous-brown fasciae; spots paler, edged with dark ferruginous; median line ferruginous; terminal area brownish-mixed. Hindwings ochreous-whitish; discal spot, postmedian line, and subterminal fascia pale fuscous.

Britain to Caledonian Canal, Ireland, rather local; C. Europe, NW Asia; 8, 9. Larva ochreous-whitish to pale brownish, sometimes pink-tinged; spots large, black; head yellow-brown; plate of 2 dark brown: in stems of *Carduus, Arctium, Verbascum,* etc.; 5-8.

24. Nonagria, *O*

Head with projecting quadrangular horny frontal plate, concealed in dense scales; eyes glabrous. Antennae in ♂ ciliated. Thorax with slight anterior crest. Abdomen elongate, not crested.

A small genus, but distributed throughout the principal regions, except New Zealand; it is a development of *Caradrina.* All the species are marsh-frequenting; the larvae feed within the stems of marsh-plants, and the pupae are found in the same position.

1. Hindwings pale yellowish terminally . 3. *sparganii.*
   „ not pale yellowish terminally . . 2.
2. Subterminal line preceded by dark fuscous marks 5. *arundinis.*
   „ „ not preceded by dark fuscous marks . . . . . . 3.
3. Second line indicated by distinct blackish dots . 4.
   „ not indicated by distinct dots 4. *geminipuncta.*
4. Orbicular and reniform indicated by dark marks 1. *dissoluta.*
   „ „ not distinctly indicated 2. *cannae.*

1. **N. dissoluta,** *Tr.* (*arundineta,* Schm.; *neurica,* Dup.) 27-31 mm. Forewings brownish-ochreous, more reddish-tinged in disc, towards costa sprinkled with dark fuscous, with a rather dark fuscous longitudinal median suffusion; veins partly marked with whitish and dark fuscous, some of these dots indicating

second line; orbicular indicated by two blackish dots; reniform partly dark-outlined, lower end dark fuscous, partly whitish-edged; black terminal dots. Hindwings light fuscous, more whitish anteriorly.

Suffolk, Norfolk, Cambridge, Lancashire, local; C. Europe; 7, 8. Larva pale pinkish-ochreous; spiracular line pale, slender, indistinct; head reddish-brown: in stems of reed (*Phragmites*); 4-6.

2. **N. cannae**, *O.* 33-40 mm. Forewings ochreous-brown, ferruginous-tinged, to pale greyish-ochreous; lower median vein irrorated with fuscous in disc; second line represented by a series of blackish dots. Hindwings fuscous; an indistinct darker postmedian line.

Hants, Norfolk, Cambridge, York, local; C. Europe; 8, 9. Larva greenish; dots black; head brownish; plate of 2 green-whitish: in stems of *Typha latifolia*; 5-6. Pupa usually with head upwards.

3. **N. sparganii**, *Esp.* 33-42 mm. Forewings light yellow-ochreous, more or less reddish-tinged; veins paler and sprinkled with dark fuscous, especially lower median vein in disc; lower end of reniform indicated by two blackish dots; second line represented by a series of blackish dots; terminal blackish interneural dots. Hindwings pale dull yellowish, more or less suffused with fuscous except towards dorsum and termen.

Surrey, local; C. Europe; 9. Larva slender, pale yellow-green; subdorsal and lateral lines darker; head and plate of 2 pale brown: in stems or leaf-base of *Iris pseudacorus*, *Sparganium*, and *Typha*; 7, 8. Pupa usually with head upwards.

4. **N. geminipuncta**, *Hatch.* 27-35 mm. Forewings reddish-brown to greyish-ochreous; lower end of reniform indicated by a whitish dark-margined dot, sometimes with a second above it Hindwings fuscous.

S. England to Cambridge and Somerset, local; C. Europe; 7, 8. Larva pinkish-ochreous; spiracular line paler; head dark brown: in stems of reed (*Phragmites*); 5, 6.

5. **N. arundinis**, *F.* (*typhae*, Esp.) 38-50 mm. Forewings reddish-brown, brownish-ochreous, or light greyish-ochreous; veins partly paler, sprinkled with dark fuscous; first and second lines represented by series of dark fuscous dots; outline of reniform partly indicated by dark marks; subterminal line faint, preceded by small dark fuscous wedgeshaped marks; terminal dark fuscous interneural dots. Hindwings dull yellow-whitish; a light fuscous terminal band.

England, Ireland, local; C. Europe; 9. Larva pale ochreous or pinkish-ochreous; spiracular line paler; head and plate of 2 reddish-brown: in stems of *Typha;* 7, 8. Pupa usually with head downwards.

25. COENOBIA, *Hw.*

Head with triangular projecting horny frontal plate, concealed in dense scales; eyes glabrous. Antennae in ♂ ciliated. Thorax with slight anterior crest. Abdomen not crested. Tibiae with appressed scales.

Restricted to the single species; closely correlated with *Nonagria.*

1. **C. rufa**, *Hw.* (*despecta*, Tr.) 21-23 mm. Forewings whitish-ochreous mixed with pale reddish-ochreous; veins sprinkled with dark grey and whitish; first and second lines indicated by series of black dots. Hindwings whitish, posteriorly grey-sprinkled; an indistinct postmedian series of dark dots.

England to Cheshire, E. and W. Ireland, in damp grassy places, local; France, Germany; 7. The larva may probably be an internal feeder.

26. LUPERINA, *B.*

Head rough-scaled; eyes glabrous. Tongue short, slight. Antennae in ♂ ciliated. Thorax without distinct crest. Abdomen not crested.

Contains only two or three closely allied European species, differing little from *Caradrina*, of which it is a development.

Claviform followed by a blackish streak . 1. *testacea.*
,, not followed by blackish streak . 2. *Dumerilii.*

1. **L. testacea**, *Hb.* (*Guenei*, Dbld.; *Nickerlii*, Frr.) 31-37 mm. Forewings light brownish-ochreous, more or less suffused with brown, especially on median band and terminal area; lines somewhat paler, obscurely darker-margined; spots more or less lighter-marked, partly blackish-outlined, claviform connected with second line by an obscure blackish streak; dorsum sometimes blackish on median band. Hindwings white; a dark fuscous terminal line.

Britain to Caledonian Canal, Ireland, common; C. Europe; 8, 9. Larva much wrinkled, pinkish-ochreous; dots wholly absent; head and plate of 2 brownish-yellow; plate of 13 sub concave: amongst roots of grasses; 5-7. The form described as *Guenei* seems to be a well-marked local variety, less ochreous-tinged and having the cilia of hindwings white instead of pale ochreous as usual.

2. **L. Dumerilii**, *Dup.* 29-34 mm. Differs from *L. testacea* as follows: forewings without blackish streak beyond claviform; hindwings white or ochreous-whitish.

Sussex, Dorset, I. of Arran, probably a casual immigrant only; France, SE. Europe, Asia Minor; 8. The specific distinctness of this form from the preceding species seems rather uncertain.

27. SPODOPTERA, *Gn.*

Head with tolerably appressed scales; eyes glabrous. Antennae in ♂ ciliated. Thorax with posterior crest. Abdomen with well-defined crest at base. Posterior tibiae with appressed scales.

A small genus, ranging widely throughout tropical and warmer temperate regions; it is an offshoot of *Caradrina.* Some of the species have also a very wide distribution; their flight is strong, and they have been captured hundreds of miles from land.

1. **S. exigua**, *Hb.* 25-29 mm. Forewings rather narrow, brown, sprinkled with whitish and blackish, especially on veins; costa spotted with darker; first and second lines pale, edged with dark fuscous; orbicular and reniform pale ochreous, blackish-outlined, reniform centrally mixed with brown and whitish; median shade indistinctly darker; subterminal line pale. Hindwings subhyaline, white; veins and termen dark fuscous.

Kent to Cornwall, Pembroke, Lancashire, I. of Man, local and uncommon; S. Europe, Asia, Africa, America, Australia; 6, 7. Larva pinkish-brown; dots blackish; spiracular line light ochreous, dark-edged above: on *Plantago;* 8, 9.

28. RUSINA, *B.*

Head rough-scaled; eyes glabrous. Antennae in ♂ bipectinated to apex. Thorax with anterior and posterior crests. Abdomen not crested.

1. **R. tenebrosa**, *Hb.* 31-38 mm. Forewings fuscous, more or less ochreous-tinged; five or six whitish costal dots; first and second lines fine, dark fuscous; median shade thick, cloudy, dark fuscous; orbicular and reniform indistinct, sometimes obscurely paler-marked or darker-outlined; subterminal line sometimes paler, suffusedly darker-edged anteriorly. Hindwings fuscous.

Britain to Ross, Ireland, common; N. and C. Europe; 6, 7. Larva ochreous-brown; dorsal line sometimes obscurely pale;

sometimes subdorsal series of pale oblique marks, dark-edged beneath; lateral line pale; head dark brown: on *Viola, Rumex, Polygonum*, etc.; 8-3.

29. ACOSMETIA, *Stph.*

Head with appressed scales; eyes glabrous. Antennae in ♂ ciliated. Thorax smooth-scaled. Abdomen not crested. Tibiae smooth-scaled.

Only one species is known; it is a development of *Caradrina*.

1. **A. caliginosa**, *Hb.* 23-27 mm. Forewings rather light brown, somewhat sprinkled with grey-whitish; lines and reniform very faintly indicated. Hindwings pale whitish-fuscous, more fuscous posteriorly.

Hants (New Forest), local; C. Europe, NW. Asia; 6, 7. Larva on *Rumex, Poterium, Polygonum*, etc.; 8, 9.

30. AMPHIPYRA, *O.*

Head rough-scaled; eyes glabrous. Antennae in ♂ ciliated. Palpi long, ascending, second joint thickened with dense tolerably appressed scales, terminal pointed. Thorax without crest. Abdomen not crested.

A rather small genus, ranging through most of the northern hemisphere except towards the equator.

Lines of forewings distinct . . . 1. *pyramidea.*
,, ,, absent . . 2. *tragopogonis.*

1. **A. pyramidea**, *L.* 47-52 mm. Forewings brown, pale-sprinkled; subbasal, first, and second lines pale, edged with dark fuscous; median shade broad, suffused, dark fuscous; orbicular small, pale, central mark and outline dark fuscous, placed in a dark fuscous longitudinal suffusion running from first line to second; subterminal line pale, on upper half preceded by blackish wedgeshaped marks. Hindwings coppery, costa broadly fuscous.

England to York, S. Ireland, common; Europe, Asia Minor, N. Asia; 8. Larva green; dorsal line white; subdorsal yellowish-white, interrupted; spiracular greenish-white; dots yellowish-white; head green; 12 with a conical prominence directed obliquely backwards, apex horny, red-brown: on oak, birch, elm, etc.; 5, 6.

2. **A. tragopogonis**, *L.* 30-38 mm. Forewings fuscous; a dark fuscous dot representing orbicular, and two transversely placed representing reniform. Hindwings whitish-fuscous, becoming fuscous posteriorly.

Britain to Ross, Ireland, common; N. and C. Europe, WC. Asia to Turkestan, N. America; 8. Larva green; dorsal, subdorsal, and spiracular lines white or pale yellow, spiracular sometimes partly blackish-edged above; head green; 12 with slight protuberance: on *Plantago*, hawthorn, *Aquilegia*, etc.; 5, 6.

31. CARADRINA, *O.*

Head rough-scaled; eyes glabrous. Antennae in ♂ ciliated, seldom bipectinated with apex filiform. Thorax sometimes with anterior and posterior crests, usually slight. Abdomen not crested.

A large genus of almost universal distribution, but absent from New Zealand.

1. Reniform obsolete . . . . 2.
   ,, more or less indicated . . . 13.
2. Second line entire, not dotted . . . 3.
   ,, black-dotted or absent . . 5.
3. Second line angulated . . . . 4.
   ,, not angulated . 29. *trigrammica.*
4. First and second lines forming white spots on costa 2. *diffinis.*
   ,, ,, not forming white spots . 1. *pyralina.*
5. Subterminal line brownish-edged . . 21. *arcuosa.*
   ,, ,, obsolete . . . 6.
6. Forewings whitish-ochreous . . . 7.
   ,, not whitish-ochreous . . . 12.
7. Second line black-dotted . . . . 8.
   ,, obsolete . . . . 11.
8. Veins sprinkled with dark fuscous . . 9.
   ,, not sprinkled with dark fuscous . . 10.
9. Hindwings fuscous-sprinkled , . 12. *lutosa.*
   ,, not fuscous-sprinkled . . 13. *elymi.*
10. Hindwings terminally dark fuscous . 20. *Morrisii.*
    ,, not dark fuscous terminally . 19. *concolor.*
11. Hindwings brownish-whitish . . 15. *musculosa.*
    ,, light fuscous . . 16. *phragmitidis.*
12. Forewings usually with black basal dash; species larger . . . 17. *brevilinea.*
    ,, without black basal dash; species smaller . . . 14. *fulva.*
13. Hindwings with broad defined dark terminal band 14.
    ,, without defined dark terminal band . 16.

14. Hindwings fuscous . . . 3. *affinis.*
,, yellowish . . . . 15.
15. Orbicular and reniform whitish-edged . 30. *matura.*
,, ,, not whitish-edged 9. *umbra.*
16. Orbicular and reniform outlined with ferruginous or reddish . . 17.
,, ,, not so outlined . . 18.
17. Veins ferruginous . . . . 7. *oo.*
,, not ferruginous . . . 8. *paleacea.*
18. First line distinct . . . . 19.
,, obsolete . . 18. *Hellmanni.*
19. Lower end of reniform enclosing a blackish dot . 4. *trapezina.*
,, ,, not enclosing a blackish dot . . . 20.
20. Lines forming black dots on costa 23. *quadripunctata.*
,, not forming black dots on costa . . 21.
21. Orbicular and reniform dot-like, dark fuscous 22. *palustris.*
,, ,, not dot-like . . 22.
22. Abdomen densely hairy . . . 28. *exulis.*
,, not densely hairy . . . 23.
23. Orbicular and reniform pale-edged . . 24.
,, ,, not pale-edged . . 28.
24. Lines distinctly pale . . . . 25.
,, dark fuscous . . . . 26.
25. First and second lines almost parallel . 6. *retusa.*
,, ,, not parallel . 5. *subtusa.*
26. Hindwings white . . . . 27. *ambigua.*
,, not white . . . 27.
27. Orbicular and reniform distinctly darker . 25. *alsines.*
,, ,, hardly darker . 26. *taraxaci.*
28. Hindwings more or less whitish . . . 29.
,, brown-grey . . . 11. *petasitis.*
29. Second line nearly straight . . 10. *micacea.*
,, not nearly straight . . 24. *morpheus.*

1. **C. pyralina**, *View.* 28-31 mm. Antennae in ♂ ciliated. Forewings reddish-fuscous, somewhat paler-mixed; first, median, and second lines dark fuscous, two latter strongly angulated, second finely whitish-edged posteriorly, becoming a broader white suffusion towards costa; subterminal line pale, towards costa white and indented. Hindwings fuscous, lighter towards base.

England to York, local; C. Europe; 8. Larva yellowish-green, speckled with yellow-whitish; dorsal line yellowish-white, ends rosy-tinged; subdorsal of yellowish-white dots, interrupted; spiracular greenish-white; head ochreous, speckled with red-brown: on pear and plum; 4, 5.

2. **C. diffinis**, *L.* 29-33 mm. Antennae in ♂ ciliated. Forewings ferruginous-fuscous, becoming deep ferruginous towards costa; subbasal line white; first, second, and subterminal lines pale, two former forming large subtriangular white spots on costa; median line darker fuscous. Hindwings fuscous, becoming dark fuscous terminally.

England to York, rather common; C. and SW. Europe, Asia Minor; 7, 8. Larva green; dorsal line ochreous-whitish; subdorsal irregular, whitish, darker-edged; spiracular pale yellow; dots ochreous-whitish; head very dark-brown: on elm; 5, 6.

3. **C. affinis**, *L.* 27-29 mm. Antennae in ♂ ciliated. Forewings ferruginous-brown, somewhat paler-mixed; first and second lines pale, more whitish towards costa, interiorly darker-edged, second abruptly bent; median shade darker fuscous; orbicular and reniform obscurely pale, dark-centred; subterminal line pale, anteriorly suffusedly dark-margined; two or three blackish terminal dots about apex. Hindwings fuscous, with a broad blackish terminal suffusion; cilia yellow.

England to York, S. Ireland, not uncommon; C. and SW. Europe; 7, 8. Larva green; dorsal and subdorsal lines white; spiracular yellowish-white, sometimes dark-edged above; dots white; head yellowish-green: on elm; 5, 6.

4. **C. trapezina**, *L.* 27-35 mm. Antennae in ♂ ciliated. Forewings greyish-ochreous to reddish-ochreous, somewhat paler-mixed; first and second lines pale, internally dark-edged, nearly approximated on dorsum; median shade cloudy, darker; orbicular sometimes obscurely pale; reniform obscurely pale-edged, lower end enclosing a blackish dot; subterminal line pale, anteriorly dark-edged. Hindwings fuscous, darker posteriorly, costa and sometimes termen pale yellowish.

Britain to Ross, Ireland, very common; C. Europe, Asia Minor, N. Africa; 7, 8. Larva light green; dorsal and subdorsal lines narrow, yellow-whitish; spiracular broad, yellow-whitish, sometimes edged above with blackish-grey; spots white, black-centred; head green: on oak, elm, *Salix*, etc., but more commonly carnivorous, feeding on other caterpillars; 5, 6.

5. **C. subtusa**, *F.* 27-30 mm. Antennae in ♂ ciliated. Forewings fuscous; costal edge, subbasal, first, and second lines finely pale yellowish; spots rather dark brown, outlined with pale yellowish; median shade somewhat darker; subterminal more or less obscurely pale, edged anteriorly with darker brown. Hindwings fuscous, darker posteriorly.

Britain to the Clyde, N. Ireland, local; C. Europe, NW. Asia; 7, 8. Larva pale yellowish-green; rather broad dorsal and narrow subdorsal lines pale yellow or whitish; spiracular pale yellow; head yellow, black-marked: between spun leaves of poplar and aspen; 4, 5.

6. **C. retusa**, *L.* 25-27 mm. Antennae in ♂ ciliated. Forewings fuscous; subbasal, first, and second lines fine, pale, suffusedly darker-edged posteriorly, nearly straight, parallel; orbicular and reniform darker, finely outlined with pale, latter placed on indistinct darker median shade; subterminal line somewhat paler, irregular, posteriorly darker-edged. Hindwings fuscous.

England to York, local; N. and C. Europe, NW. Asia; 7-9. Larva pale green; broad dorsal, slender subdorsal, and waved spiracular lines whitish; head yellow-green or black-brown: between joined leaves of *Salix*, poplar, and birch; 5, 6.

7. **C. oo**, *L.* 31-37 mm. Antennae in ♂ shortly bipectinated. Abdomen in ♀ pointed, with long ovipositor. Forewings pale whitish-yellowish, somewhat sprinkled with ferruginous; veins, subbasal, first, and second lines, a fascia before first line, median shade, outlines of spots, and anterior edge of subterminal line ferruginous. Hindwings grey-whitish.

S. England to Worcester and Rutland, local; C. and S. Europe, WC. Asia to N. Persia; 7. Larva blackish; irregular dorsal and slender subdorsal lines white; spiracular broad, yellowish-white, divided by a fine dark line; dots white; head black: amongst spun leaves of oak; 4, 5.

8. **C. paleacea**, *Esp.* (*fulvago*, Hb.) 40-44 mm. Antennae in ♂ ciliated. Forewings light yellow-ochreous, sprinkled with pale brown-reddish; first and second lines fine, brown-reddish, first right-angled; median shade brown-reddish, indistinct, angulated; orbicular and reniform outlined with brown-reddish, lower end of reniform marked with a grey spot; subterminal line hardly marked; dark fuscous terminal dots. Hindwings whitish-yellowish.

Britain to Ross, local; N. and C. Europe, NW. Asia, N. America; 8. Larva pale dull green, whitish-dusted, incisions yellowish; dorsal and subdorsal lines white; spiracular double, white, spiracles purple-edged; head pale yellow: on birch and oak; 5, 6.

9. **C. umbra,** *Hufn.* (*marginata*, F.) 29-33 mm. Antennae in ♂ ciliated. Forewings reddish-ochreous, beyond second line suffused with brownish; all lines and outlines of spots ferruginous, first line with two angular indentations, median angulated above middle, reniform darker towards centre, claviform faint. Hindwings whitish-yellowish, veins reddish-fuscous; a broad dark fuscous terminal fascia, terminally suffused with reddish.

Britain to Caledonian Canal, E. and W. Ireland, local; C. and SE. Europe, N. and WC. Asia, N. America; 5, 6. Larva dull green or dark grey, speckled with white and dorsally with black; dorsal line double, whitish; subdorsal whitish or pale yellow; spiracular yellowish or pale ochreous, white-edged above; dots black; head pale green or reddish-ochreous; plate of 2 sometimes black: on *Ononis;* 7, 8.

10. **C. micacea,** *Esp.* 31-39 mm. Antennae in ♂ ciliated. Forewings pale rosy-brownish, sprinkled with brown; median area suffused with brown posteriorly; subbasal, first, and second lines dark fuscous, first indented above middle, second nearly straight except near costa; orbicular and reniform outlined with dark fuscous; subterminal line obscurely pale. Hindwings fuscous-whitish, more fuscous posteriorly; a fuscous postmedian line.

Britain to the Shetlands, Ireland, common; N. and C. Europe, N. Asia; 8, 9. Larva dull brownish-ochreous, purplish-tinged; subspiracular line paler; dots blackish; head ochreous-brown; plate of 2 with anterior edge blackish: in stems of *Equisetum, Valeriana, Rumex*, etc.; 5, 7.

11. **C. petasitis,** *Dbld.* 42-48 mm. Antennae in ♂ ciliated. Forewings fuscous, median area darker posteriorly; veins posteriorly white-sprinkled; first and second lines obscurely paler, internally somewhat darker-edged; orbicular and reniform somewhat paler, darker-outlined; subterminal line obscurely pale, terminal area darker. Hindwings brownish-grey, with darker postmedian line.

Hants, Somerset, Suffolk to Perth, E. Ireland, local; Germany, NW. Asia; 9. Larva grey-whitish; dots black; head and plate of 2 brown: in roots and stems of *Petasites;* 6, 7.

12. **C. lutosa,** *Hb.* (*crassicornis*, Hw.) 41-50 mm. Antennae

in ♂ ciliated. Forewings whitish-ochreous, finely sprinkled with black, sometimes rosy-tinged; second line represented by a row of black dots. Hindwings whitish, sprinkled with fuscous; an indistinct postmedian series of fuscous dots.

Britain to the Shetlands, local; NC. Europe; 8-10. Larva whitish-ochreous, pinkish-tinged; head light red-brown: in stems of reed (*Phragmites*); 3-6.

13. **C. elymi**, *Tr.* 33-35 mm. Antennae in ♂ ciliated. Forewings whitish-ochreous, brownish-tinged; veins sprinkled with dark fuscous; second line indicated by a double row of ill-defined dark fuscous dots; cilia somewhat barred obscurely with fuscous. Hindwings ochreous-white.

Suffolk to Forfar, on coasts, local; Denmark, N. Germany; 7. Larva whitish-ochreous, pinkish-tinged; head reddish-brown: amongst stem-bases of *Elymus arenarius;* 4, 5.

14. **C. fulva**, *Hb.* 22-29 mm. Antennae in ♂ ciliated. Forewings greyish-ochreous or yellow-ochreous, more or less sprinkled with reddish-fuscous, especially on veins; sometimes two or three blackish dots indicating second line; cilia pale greyish-rosy. Hindwings grey.

Britain to Sutherland, Ireland, rather local; C. Europe, NW. Asia; 8, 9. Larva whitish-ochreous, pinkish-tinged; subdorsal and spiracular lines brownish; head and plate of 2 light brown: in lower part of stem of *Carex paludosa;* 6, 7.

15. **C. musculosa**, *Hb.* 30-33 mm. Antennae in ♂ ciliated. Forewings pale whitish-ochreous, obscurely suffused longitudinally with light yellow-ochreous, the pale ground colour appearing especially along fold and on a streak from disc to apex. Hindwings brownish-whitish.

Sussex, Lancashire (?), scarce, probably an occasional immigrant only; SC. and S. Europe, Asia Minor; 7, 8.

16. **C. phragmitidis**, *Hb.* 31-34 mm. Antennae in ♂ ciliated. Forewings whitish-ochreous, posteriorly tinged with red-brownish; cilia brown, tips darker. Hindwings light fuscous.

Kent to Cheshire and York, local; NC. Europe, WC. Asia to Turkestan; 6, 7. Larva whitish-ochreous; subdorsal line broad, interrupted, purplish-fuscous; lateral narrow, similar; head black; plate of 2 brown: in stems and on leaves of reed (*Phragmites*); 9-6. Pupa on the ground.

17. **C. brevilinea**, *Fenn.* 29-33 mm. Antennae in ♂ ciliated. Forewings brownish, dark-sprinkled, veins paler posteriorly; a

black median basal dash, seldom obsolete; first and second lines represented by series of black dots. Hindwings light fuscous, darker posteriorly; sometimes a postmedian series of obscure blackish dots.

Norfolk, in fens, very local; not recorded elsewhere; 7, 8. Larva pale ochreous, brown-freckled; dorsal, subdorsal, and spiracular lines orange edged with pale yellow; head light brown: on reed (*Phragmites*); 5, 6. When young, the larva feeds within the stems.

18. **C. Hellmanni**, *Ev.* 25-29 mm. Antennae in ♂ ciliated. Forewings pale ochreous, more or less irrorated or suffused with light reddish-fuscous; veins irrorated with whitish and dark fuscous; an indistinct fuscous spot indicating lower extremity of reniform; second line indicated by a series of indistinct dark dots; cilia fuscous. Hindwings light fuscous, somewhat whitish-suffused anteriorly.

Suffolk to Lincoln, in fens, local; NC. Europe, NW. Asia; 6. Larva in stems of reed (*Phragmites*); 5.

19. **C. concolor**, *Gn.* (? *extrema*, Hb.) 25-27 mm. Antennae in ♂ ciliated. Forewings pale whitish-ochreous, sprinkled with pale greyish-ochreous; second line represented by a series of blackish dots, sometimes nearly obsolete. Hindwings whitish-grey or pale grey.

Cambridge, in fens, local; Germany to Hungary; 6.

20. **C. Morrisii**, *Dale* (*Bondii*, Knaggs) 29-32 mm. Antennae in ♂ ciliated. Forewings ochreous-whitish; second line represented by a series of blackish dots. Hindwings dark fuscous mixed with whitish except terminally; a darker postmedian line; cilia whitish.

Kent to Devon, on coasts, local; Germany, Greece; 6, 7. Larva on *Festuca arundinacea*; 8.

21. **C. arcuosa**, *Hw.* 20-25 mm. Antennae in ♂ ciliated. Forewings pale ochreous, more or less brown-sprinkled; median area sometimes brown, especially on lower half; first and second lines sometimes partly whitish, usually represented only by series of black dots; subterminal line brownish-edged. Hindwings dark grey.

Britain to Caledonian Canal, N. and E. Ireland, common; C. Europe; 7. Larva whitish-ochreous, sometimes pinkish-tinged, transversely barred with darker or brownish; dorsal and subdorsal lines paler; head brown; plate of 2 pale brown: amongst stem-bases of *Aira caespitosa*; 4, 5.

22. **C. palustris**, *Hb.* 27-34 mm. Antennae in ♂ ciliated.

Forewings fuscous, in ♀ darker; first and second lines dark fuscous, waved; orbicular and reniform dot-like, dark fuscous; subterminal line edged anteriorly with dark fuscous, especially towards costa. Hindwings light fuscous; a darker crescentic discal mark.

Norfolk, Cambridge, York, scarce and local; N. and C. Europe; 5, 6. Larva brownish; dorsal line whitish; dots whitish; head black: on *Plantago*, etc.; 7, 8.

23. **C. quadripunctata**, *F.* (*cubicularis*, Bkh.) 25-32 mm. Antennae in ♂ ciliated. Forewings greyish-ochreous, sprinkled with fuscous; subbasal, first, median, and second lines indistinct, fuscous, forming black dots on costa; orbicular and reniform small, dark fuscous, often outlined with white dots; subterminal line pale, edged with brown anteriorly. Hindwings white; veins fuscous; a suffused dark fuscous terminal line.

Britain to the Shetlands, Ireland, common; Europe, N. and WC. Asia; 6-8. Larva fuscous, sometimes dorsally greenish-tinged; dorsal line obscurely paler, dark-edged, sometimes interrupted; lateral sometimes dark-edged, hardly paler; spiracular pale, dark-edged above; head blackish or dark fuscous: on corn, peas, etc., especially in ricks, forming a small chamber for habitation; 9-5.

24. **C. morpheus**, *Hufn.* 28-33 mm. Antennae in ♂ ciliated. Forewings brownish-ochreous, partially fuscous-tinged; subbasal, first, and second lines dark fuscous, each with a parallel fuscous line; median shade rather dark fuscous; orbicular and reniform fuscous, edged with dark brown; subterminal line somewhat paler, edged anteriorly with dark fuscous. Hindwings whitish, in ♀ posteriorly infuscated.

Britain to Caledonian Canal, E. and W. Ireland, rather common; N. and C. Europe; 6-8. Larva brown or grey-brown; dorsal line paler, interruptedly darker-edged; a subdorsal series of blackish arrow-heads; spiracular obscurely darker; head brown, darker-freckled: on *Sedum*, *Salix*, *Rubus*, etc.; 9, 10.

25. **C. alsines**, *Brh.* 29-33 mm. Antennae in ♂ ciliated. Forewings ochreous-fuscous or brownish-ochreous; first and second lines waved, dark fuscous; median shade dark fuscous, sometimes indistinct; orbicular and reniform rather dark fuscous, outlined with pale; subterminal line pale, edged anteriorly with dark fuscous. Hindwings fuscous, somewhat lighter anteriorly.

Britain to Caledonian Canal, N. Ireland, rather common;

N. and C. Europe, Asia Minor, N. Asia; 7, 8. Larva ochreous, sometimes reddish-tinged, dorsally more brownish; dorsal line pale, partly dark-edged; subdorsal pale, dark-edged, more broadly beneath; sometimes a lateral series of dark brown marks; spiracular pale; head dark brown: on *Stellaria*, *Rumex*, *Viola*, etc.; 9-5.

26. **C. taraxaci**, *Hb.* (*blanda*, Tr.) 29-33 mm. Differs from *C. alsines* as follows: forewings rather dark fuscous, faintly ochreous-tinged, lines more indistinct, orbicular and reniform hardly darker than ground-colour, finely outlined with grey-whitish; hindwings in ♂ more whitish towards base.

Britain to Caledonian Canal, Ireland, common; C. Europe, Asia Minor; 7. Larva light ochreous or brownish, somewhat blackish-freckled; dorsal line pale yellowish, traversing a series of small blackish marks; subdorsal pale, edged below by a strong dark brown line; spiracular brownish; head ochreous, brown-marked: on *Stellaria*, *Rumex*, grass, etc.; 9-4.

27. **C. ambigua**, *F.* 29-32 mm. Antennae in ♂ ciliated. Forewings greyish-ochreous, sprinkled with dark fuscous; first and second lines indistinct, fuscous, marked with darker dots; median shade indistinctly darker; orbicular and reniform rather darker, finely outlined with pale; subterminal line pale, anteriorly darker-edged. Hindwings white; veins fuscous-tinged; termen fuscous.

Kent, I. of Wight, perhaps recently introduced or an occasional immigrant only; WC. and S. Europe; 7, 8.

28. **C. exulis**, *Lef.* (*assimilis*, Dbld.) 37-42 mm. Antennae in ♂ ciliated. Abdomen densely hairy. Forewings brown, mixed with dark brown and often with whitish or yellowish; veins sometimes white; subbasal, first, second, and subterminal lines light, edged with dark fuscous; spots outlined with dark fuscous, orbicular and reniform more or less margined with whitish-ochreous. Hindwings fuscous, darker posteriorly; a darker discal mark and postmedian line.

Arran to the Shetlands, local and uncommon; N. Europe, N. America; 6, 7. Larva ochreous-whitish; spiracles black; head reddish-brown; plate of 2 ochreous: in stems and amongst roots of grass, and amongst lichens; 8-5.

29. **C. trigrammica**, *Hufn.* (*trilinea*, Bkh.) 34-39 mm. Antennae in ♂ ciliated. Forewings greyish-ochreous to ochreous-fuscous; subbasal, first, median, and second lines rather dark fuscous, nearly straight, median sometimes almost obsolete. Hindwings rather dark grey.

Britain to Forfar, Ireland, common; C. Europe; 6. Larva greyish-ochreous, dull reddish-brown, or dark grey; dorsal line pale, black-edged on incisions; subdorsal pale, interrupted, sometimes edged with blackish marks above; spiracular brown; head dark brown: on *Plantago*, subterranean in habit; 7-4.

30. **C. matura**, *Hufn.* (*cytherea*, F.) 37-44 mm. Antennae in ♂ ciliated. Forewings fuscous; subbasal, first, and second lines irregular, whitish, edged with dark fuscous; spots outlined with dark fuscous, orbicular and reniform edged with whitish; subterminal line whitish, irregular. Hindwings yellow; a broad dark fuscous terminal fascia.

Britain to Caledonian Canal, Ireland, rather common; C. Europe; 7, 8. Larva pale brownish-ochreous or brownish; dorsal series of pairs of dark fuscous longitudinal marks; subdorsal and lateral lines brown-edged; subspiracular paler or whitish-ochreous, brown-edged above; head light ochreous or brownish: on grasses; 9-4.

32. SENTA, *Stph.*

Head with loosely appressed scales; eyes glabrous. Antennae in ♂ ciliated. Thorax with anterior crest. Abdomen elongate, flattened, not crested. Tibiae with appressed scales.

There is only one European species, and possibly a second in N. America; the genus is correlated with the preceding.

1. **S. maritima**, *Tausch.* (*ulvae*, Hb.) 29-32 mm. Forewings rather narrow, suboblong, ochreous, veins streaked and costa and dorsum broadly suffused with fuscous; orbicular and reniform interruptedly outlined with whitish, sometimes wholly dark fuscous; first and second lines represented by series of dark fuscous dots; a terminal series of dark fuscous dots. Hindwings ochreous-whitish; a grey discal mark, and sometimes a postmedian series of dots.

Surrey to Norfolk and Cambridge, local; C. Europe; 6, 7. Larva ochreous, with fine darker lines: on leaves and in stems of reed (*Phragmites*); 9-4.

33. STILBIA, *Stph.*

Head with appressed scales, face forming a flatly-rounded prominence; eyes glabrous. Antennae in ♂ ciliated. Thorax with slight posterior crest. Abdomen not crested. Tibiae with appressed scales. Hindwings: 8 anastomosing with upper margin of cell to middle.

This genus, consisting of the following and one other C.

Asiatic species, differs from all others of the family in the structure of vein 8 of the hindwings, but must be regarded as an abnormal development, probably correlated with *Caradrina*. Imago with rather slender body, wings relatively large.

1. **S. anomala**, *Hw.* 28-35 mm. Forewings grey, towards costa suffused with rather dark fuscous; first and second lines dark fuscous, rather dentate; orbicular and reniform edged with whitish and outlined with dark fuscous, orbicular elongate and oblique; subterminal line pale, suffusedly darker-edged, often indistinct. Hindwings fuscous-whitish, posteriorly irrorated with fuscous.

Britain to the Orkneys, Ireland, local; France, Germany; 8, 9. Larva green or pale brown; dorsal and subdorsal lines white or yellowish, dark-edged; spiracular whitish, grey-edged above; head brown or greenish, freckled with dark brown: on grasses; 9-3.

34. ACTINOTIA, *Hb.*

Head rough-scaled; eyes glabrous. Antennae in ♂ ciliated. Thorax with anterior and posterior crests. Abdomen crested towards base. Middle and posterior tibiae spinose.

A small genus, but very generally distributed except in New Zealand.

1. **A. polyodon**, *Cl.* (*perspicillaris*, L.) 29-33 mm. Forewings yellow-brownish; a fuscous-purplish costal suffusion to $\frac{3}{4}$; a blackish median streak from base to near middle, above which is a whitish-ochreous suffusion; reniform large, edges and a central line whitish-ochreous, preceded and followed by deep ferruginous marks; a whitish-ochreous suffusion from middle of reniform to apex; subterminal line whitish-ochreous, two teeth below apex and two in middle reaching into cilia; some black-brown terminal wedges. Hindwings whitish-fuscous; discal spot and broad terminal band fuscous.

Kent, Norfolk, probably a scarce immigrant; N. and C. Europe, N. Asia; 5. Larva reddish-brown, darker-dotted; dorsal line narrow, yellow; subdorsal series of oblique brown marks; spiracular yellow, dark-edged; head brown: on *Hypericum*; 7, 8.

35. HADENA, *Schrk.*

Head rough-scaled; eyes glabrous. Antennae in ♂ ciliated, seldom bipectinated with apex filiform. Thorax with anterior and posterior crests. Abdomen more or less strongly crested.

A genus of considerable extent, widely distributed, but principally occurring in temperate regions of the northern hemisphere, and not reaching New Zealand.

1. Termen of forewings subconcave beneath 1. *meticulosa.*
,, ,, not subconcave beneath 2.
2. Termen of forewings strongly waved 3.
,, ,, not strongly waved 4.
3. Reniform whitish-ochreous 3. *flammea.*
,, not whitish-ochreous 5. *maura.*
4. Forewings greenish-tinged 4. *atriplicis.*
,, not greenish-tinged 5.
5. Orbicular dark slaty-fuscous, reniform whitish-ochreous 2. *lucipara.*
,, spots not both thus coloured 6.
6. Thorax ochreous, front and patagia blackish 6. *scabriuscula.*
,, not so marked 7.
7. Forewings with interrupted black streak along fold 7. *rectilinea.*
,, without such streak 8.
8. Hindwings fuscous-whitish 9.
,, not whitish 11.
9. First and second lines joined by black submedian dash 8. *adusta.*
,, ,, ,, not so joined 10.
10. Reniform partly whitish-edged 19. *sordida.*
,, not whitish-edged 11.
11. Second line dentate 21. *ochroleuca.*
,, ,, indicated by dots only 11. *lithoxylea.*
12. Forewings grey-whitish 23. *pabulatricula.*
,, not whitish 13.
13. Spots all obsolete 12. *sublustris.*
,, not all obsolete 14.
14. Hindwings dark fuscous 15.
,, not dark fuscous 16.
15. Reniform conspicuously pale 29. *captiuncula.*
,, obscure 33. *fasciuncula.*
16. Second line indicated by dark dots only 17.
,, ,, not so indicated 18.
17. Subterminal line tolerably distinct 14. *scolopacina.*
,, ,, obsolete 13. *rurea.*
18. First and second lines distinct on lower half only 19.
,, ,, ,, not more distinct on lower half 21.

19. Reniform dark-outlined anteriorly only . . 20.
,, ,, ,, on both sides . 32. *strigilis.*
20. Forewings rosy-grey . . . 30. *literosa.*
,, pale brownish-ochreous . 31. *bicoloria.*
21. First and second lines joined by a blackish submedian dash . . 22.
,, ,, ,, not so joined . . 24.
22. Median teeth of subterminal line reaching termen 23.
,, ,, ,, ,, not reaching termen . 9. *gemina.*
23. Forewings less elongate, reddish-tinged . 16. *porphyrea.*
,, more elongate, not reddish-tinged 10. *polyodon.*
24. Reniform orange or whitish-marked . . 25.
,, not orange or whitish-marked . . 32.
25. Subterminal line with two median teeth . . 26.
,, ,, without median teeth . . 31.
26. Forewings with blackish median basal dash . 27.
,, without such dash . . . 29.
27. Lower end of reniform dark grey . . 20. *basilinea.*
,, ,, ,, not dark grey . . 28.
28. Anterior edge of reniform whitish . 28. *Haworthii.*
,, ,, ,, not whitish . 25. *unanimis.*
29. Reniform white-marked on posterior edge . 30.
,, wholly orange or white . 27. *nictitans.*
30. Subterminal line whitish . . 17. *furva*
,, ,, not whitish . . 18. *abjecta.*
31. Larger, reniform rather broadly pale 24. *leucostigma.*
Smaller, reniform pale-marked on posterior edge 26. *didyma.*
32. Forewings with large dark triangular costal patch 22. *ophiogramma.*
,, without such patch . . 15 *hepatica.*

1. **H. meticulosa**, *L.* 44-50 mm. Forewings rather narrow, termen waved, subconcave on lower half; whitish-ochreous, anteriorly rosy-tinged; lines broad, indicated by fuscous margins, first and second closely approximated on dorsum, second angulated above middle; median area except on costa, and a triangular dorsal patch before it yellowish-brown; quadrate orbicular and anterior part of reniform rosy-ochreous, pale-edged, connected beneath; a light brownish terminal suffusion preceded by a black dot below apex. Hindwings ochreous-whitish, dorsally fuscous-tinged; a fuscous postmedian line and subterminal shade.

Britain to the Shetlands, Ireland, common; C. and S. Europe, Asia Minor, N. Africa; 5, 6, 9, 10. Larva green or brown, whitish-dotted; dorsal line whitish, interrupted; spiracular pale or whitish; head pale green or ochreous, brown-speckled: on *Senecio*, *Rumex*, *Viola*, etc.; 7, 8, 10-3. In repose the wings are folded longitudinally in a peculiar manner, as though crumpled.

2. **H. lucipara**, *L.* 29-32 mm. Forewings brown suffused with rosy-purplish; basal area much mixed with dark fuscous, median area wholly dark fuscous; subbasal, first, and second lines partly black-edged; spots partly outlined with black, orbicular dark slaty-fuscous, reniform whitish-ochreous; a dark fuscous terminal suffusion, enclosing obscurely pale subterminal line; cilia waved. Hindwings fuscous, paler anteriorly; postmedian and subterminal whitish-ochreous lines indicated towards dorsum.

Britain to the Orkneys, Ireland, common; N. and C. Europe, Asia Minor, N. Asia, N. America; 6, 7. Larva green or reddish-brown; dorsal series of indistinct darker V-shaped markings; dorsal and subdorsal lines obscurely pale or whitish, somewhat interrupted; spiracular more distinct, almost white; 12 with two conspicuous white dots; head pale green or ochreous: on ferns, birch, *Plantago*, etc.; 7-9.

3. **H. flammea**, *Esp.* (*empyrea*, Hb.) 44-48 mm. Forewings with termen waved; rather dark fuscous, purplish-tinged; dorsum narrowly whitish-ochreous; an elongate subdorsal blackish mark near base; first and second lines indistinctly dark-edged; spots blackish-outlined, claviform broad, wholly black-brown, reniform whitish-ochreous, preceded and followed by black-brown spots, lower end projecting anteriorly; subterminal line pale, ending in a light apical spot. Hindwings fuscous; a darker discal spot.

Sussex, local; France, S. Europe; 9, 10. Larva greenish-brown, with numerous waved dark brown or blackish lines; dorsal series of darker brown diamonds; spots whitish; head and plate of 2 dark brown: on *Ranunculus*, *Ligustrum*, ash, etc.; 12-5.

4. **H. atriplicis**, *L.* 38-48 mm. Forewings greenish-fuscous, basal area mixed with green; first and second lines broad, fuscous, internally black-edged; orbicular and large reniform greener, partly pale-edged; claviform posteriorly black-edged, followed by an oblique oblong whitish-ochreous spot; subterminal line irregular, greenish-whitish, more or less preceded by green suffusion. Hindwings fuscous, lighter anteriorly.

Hants and Essex to Lancashire, local; C. Europe, Asia Minor; 6. Larva green or reddish-brown; dorsal and subdorsal lines darker, interrupted, white-dotted; spiracular pinkish, sometimes dark-edged above, margins sometimes whiter; head pale ochreous: on *Atriplex*, *Rumex*, *Polygonum*, etc.; 8, 9.

5. **H. maura**, *L.* 60-70 mm. Forewings with termen waved; fuscous, basal area mixed with blackish-fuscous; median area dark fuscous except on costa, where it is marked transversely with dark fuscous; first and second lines pale, dark-edged, second nearly straight and vertical, followed by a pale suffusion; orbicular and reniform darker-mixed, pale-outlined; subterminal line pale, ending in a pale apical spot, preceded by dark suffusion. Hindwings rather dark fuscous; straight median and subterminal cloudy whitish-ochreous lines.

Britain to Forfar, Ireland, common; C. and S. Europe; 7, 8. Larva pale ochreous, suffusedly irrorated with dark brown; pale oblique subdorsal streaks; dorsal and spiracular lines obscurely pale, interrupted; 12 with a black posteriorly pale-edged transverse mark; head pale ochreous, brown-speckled: on *Salix*, *Rubus*, *Primula*, etc.; 9-5.

6. **H. scabriuscula**, *L.* (*pinastri*, L.) 33-39 mm. Thorax ochreous, front and patagia dark fuscous. Forewings dark ashy-fuscous; a fine median dash from base, first and second lines, and outlines of spots black; a dorsal streak, black-edged above, and two connected blotches beyond second line on lower half reddish-ochreous, whitish-mixed, upper blotch reaching termen; a terminal series of black interneural dashes. Hindwings fuscous.

Britain to Caledonian Canal, local; N. and C. Europe, Asia Minor, N. America; 6. Larva reddish-brown; dorsal line ochreous-whitish, dark-edged; subdorsal obscurely pale, dark-edged; spiracular broad, whitish, dark-edged above; head brown: on *Rumex* and *Polygonum*; 7, 8.

7. **H. rectilinea**, *Esp.* 37-40 mm. Antennae in ♂ shortly bipectinated. Thorax sometimes with white central blotch. Forewings brown, basal and terminal areas whitish-mixed, median darker and more reddish dorsally; a suffused blackish streak along fold, interrupted by lines; first and second lines whitish, first indented near dorsum, second forming a white spot on fold; spots blackish-outlined, sometimes whitish-mixed; subterminal line whitish on dorsal half, with two teeth below middle; some dark fuscous subterminal dashes towards middle. Hindwings fuscous, lighter anteriorly.

York to Sutherland, S. Ireland, local; N. and C. Europe, N.

Asia; 6. Larva dark brown, mixed with lighter and darker, laterally purple-tinged; dorsal line pale, interrupted, dark-edged; subdorsal series of pale posteriorly dark-edged oblique streaks; spiracular pale towards extremities; 12 with two ochreous dots; head dark brown: on *Salix* and *Rubus*; 7-3.

8. **H. adusta**, *Esp.* 39-45 mm. Antennae in ♂ triangular-dentate. Forewings reddish-fuscous; a black median dash from base, and a subdorsal one near base; subbasal, first, and second lines whitish-ochreous to grey, partly black-edged, connected by a blackish dash on fold; spots outlined with black, orbicular and reniform mixed and often edged with whitish-ochreous; subterminal line whitish-ochreous, preceded by dark fuscous wedges, with two teeth below middle. Hindwings fuscous-whitish, towards termen suffused with fuscous; a small fuscous discal spot.

Britain to the Shetlands, Ireland, rather common; N. and C. Europe, NW. Asia; 5, 6. Larva green, often mixed or suffused with rosy-purple; dorsal and subdorsal lines dark-edged; spiracular white or greenish-yellow; head ochreous or greenish: on *Galium*, *Origanum*, *Achillea*, etc.; 8-4.

9. **H. gemina**, *Hb.* 35-40 mm. Forewings brown, variably mixed with pale ochreous, reddish-brown, and dark fuscous; a black median basal dash, surmounted by a pale blotch; sometimes a black dash from near base of dorsum; lines pale, partly dark-edged; spots partly outlined with black and sometimes edged with paler or whitish, beneath claviform a black dash connecting first and second lines; subterminal line with two strong median teeth. Hindwings light fuscous, with darker terminal band.

Britain to the Shetlands, Ireland, common; C. Europe, N. Asia; 6, 7. Larva brown-grey, darker-striated; dorsal line yellow-whitish, dark-edged; subdorsal brownish-ochreous; spiracular broad, pale greyish-ochreous; head brownish-grey, darker-freckled; plate of 2 black, with whitish lines: on grasses; 9-4.

10. **H. polyodon**, *L.* (*monoglypha*, Hufn.) 44-50 mm. Forewings light ochreous-brownish, mixed with whitish-ochreous; a black median basal dash, and another from near base of dorsum; first and second lines somewhat paler, connected by a black submedian dash; median shade darker; spots partly outlined with black and pale-edged, claviform little marked; subterminal line pale, with two strong median teeth reaching termen, and intersecting three or four blackish dashes. Hindwings whitish-fuscous; a darker fuscous discal spot and terminal

band. A local variety occurs in which the forewings are wholly suffused with dark fuscous.

Britain to the Shetlands, Ireland, very common; N., C., and SW. Europe, Asia Minor, N. Asia; 6, 7. Larva grey or brown-grey to dark purplish-grey; spiracular line pale; spots large, black; head and plate of 2 reddish-brown or dark brown: on grasses; 9-5.

11. **H. lithoxylea,** *F.* 43-48 mm. Forewings whitish-ochreous, mixed with brownish-ochreous and whitish; indications of a dark fuscous dash from near base of dorsum; second line indicated by a series of dark fuscous dots; median shade brownish on costa; spots hardly traceable; subterminal line very faint, with indications of two strong median teeth, and two or three dark dashes beneath; cilia tinged with reddish-brown. Hindwings fuscous-whitish, terminally reddish-tinged; a fuscous subterminal band.

Britain to Caledonian Canal, Ireland, common; C. Europe, Asia Minor, NW. Asia; 7. Larva brown-grey, slightly tinged with greenish or ochreous; spiracular line hardly paler; spots large, black; head and plate of 2 dark brown or black: on grasses; 9-5.

12. **H. sublustris,** *Esp.* 40-43 mm. Forewings less elongate than in *H. lithoxylea,* brownish-ochreous, faintly reddish-tinged; second line indicated by a series of dark fuscous dots; median shade towards costa and a submedian central blotch brownish; triangular fuscous terminal patches in middle and above tornus. Hindwings whitish-fuscous, more fuscous posteriorly; a darker discal crescent and postmedian line.

England to York, Ireland, rather local; C. Europe; 6, 7. Probably the larva closely resembles that of the two preceding species and has been confused with them.

13. **H. rurea,** *F.* 35-41 mm. Forewings light greyish-ochreous, towards middle of costa or sometimes wholly suffused with rather dark ochreous-brown or reddish-brown; a suffused dash from dorsum near base, and triangular terminal spots above middle and above tornus dark reddish-fuscous; spots sometimes darker-outlined, orbicular and reniform sometimes pale or pale-edged; second line indicated by dark fuscous dots. Hindwings whitish-fuscous, posteriorly fuscous.

Britain to the Orkneys, Ireland, common; N. and C. Europe, N. Asia; 6, 7. Larva pale rosy-grey to reddish-brown; dorsal line ochreous-whitish, dark-edged; subdorsal pale; spiracular broad, pale greyish-ochreous, dark-edged above; head reddish-brown or dark brown; plate of 2 blackish, with whitish lines: on grasses, *Primula*, *Rumex*, etc.; 9-4.

14. **H. scolopacina**, *Esp.* 33-35 mm. Forewings light brownish-ochreous, partially tinged with red-brownish; a blackish dash from dorsum near base; first and second lines indicated by blackish dots; reniform partly outlined with whitish, preceded by a fuscous costal blotch; subterminal line obscurely pale, anteriorly suffusedly edged with reddish-brown; cilia mixed with blackish. Hindwings fuscous, darker posteriorly.

England, rather local; C. Europe, NW. Asia; 7, 8. Larva greenish-grey; dorsal line whitish, dark-edged; subdorsal dark grey; spiracular pale yellow, edged above with dark grey; head light brownish-ochreous or greenish: on grasses and *Luzula*; 10-6.

15. **H. hepatica**, *Hb.* 39-41 mm. Forewings brownish-ochreous, mixed with light red-brown; a black median dash from base, and another from dorsum near base, connected by a red-brown suffusion; first and second lines indistinctly dark-edged; spots partly outlined with black, orbicular and reniform separated by a red-brown suffusion, former oblique-oval; subterminal line pale, partly edged with red-brown, and some short blackish marks. Hindwings pale fuscous, darker posteriorly.

Britain to Berwick, common; C. Europe, N. Asia; 6, 7. Larva grey-brown or dark purplish-brown, darker-freckled; dorsal line pale ochreous or whitish; subdorsal obscurely pale; spiracular broad, light greyish-ochreous; head dark brown; plate of 2 blackish, with whitish lines: on grasses; 10-4.

16. **H. porphyrea**, *Esp.* (*satura*, Hb.) 38-44 mm. Forewings rather dark fuscous, reddish-tinged; a short suffused blackish median dash from base, and another from dorsum near base; first and second lines dark-edged, dentate, connected by a suffused dark fuscous submedian dash; orbicular and reniform lighter, dark-outlined; subterminal line pale, with two strong median teeth, edged with some dark marks. Hindwings fuscous, lighter towards base.

Britain to Aberdeen, E. Ireland, very scarce, perhaps an occasional immigrant only; N. and C. Europe, NW. Asia; 5, 6. Larva pinkish-brown, darker above; dorsal line indistinct, interrupted; subdorsal series of indistinct oblique grey streaks; spiracular greenish-yellowish; head brown: on *Humulus*, *Lonicera*, cherry, etc.; 7, 8.

17. **H. furva**, *Hb.* 33-38 mm. Forewings brown mixed with dark fuscous; subbasal, first, and second lines lighter, dark-

edged; spots partly outlined with dark fuscous, orbicular and reniform somewhat whitish-marked on edge, posterior edge of reniform white; subterminal line whitish, with two strong median teeth, anteriorly suffusedly edged with dark fuscous. Hindwings whitish-fuscous; a fuscous terminal band, containing towards tornus a bent whitish subterminal line.

Britain to the Shetlands, E. Ireland, local; C. Europe, N. and WC. Asia; 7. Larva pale pinkish-ochreous; spots rather small, reddish-brown; head and plate of 2 reddish-brown: on grasses; 9-6.

18. **H. abjecta**, *Hb.* 41-43 mm. Forewings fuscous; first and second lines hardly lighter, indistinctly darker-edged; spots indistinctly darker-outlined, posterior edge of reniform interruptedly marked with whitish; some whitish dots posteriorly on veins and costa; subterminal line obscurely paler, with two stronger median teeth. Hindwings whitish-fuscous, posteriorly fuscous.

Britain to the Shetlands, S. Ireland, in salt-marshes, local; NC. Europe, N. and WC. Asia; 7, 8. Larva pale pinkish-ochreous; spots pale reddish-brown; head and plate of 2 red-brown: on *Poa maritima*, *P. distans*, and *P. Borreri;* 4-6.

19. **H. sordida**, *Bkh.* (*anceps*, Hb.) 37-41 mm. Forewings brownish-ochreous, usually more or less mixed with fuscous; sometimes a blackish median dash from base and another from dorsum near base; first and second lines somewhat paler, obscurely dark-edged; spots partly darker-outlined, orbicular and reniform partly whitish-edged; subterminal line obscurely pale, brownish-edged, with two stronger median teeth. Hindwings fuscous-whitish; a fuscous terminal band.

Britain to Ross, E. Ireland, rather common; C. Europe, Asia Minor; 6. Larva pale brown; dorsal and subdorsal lines obscurely darker; lateral series of oblique blackish marks; head and plate of 2 blackish-brown: on grasses; 9-3.

20. **H. basilinea**, *F.* 33-38 mm. Forewings greyish-ochreous somewhat mixed with light brown; a fine black sinuate median dash from base; lines faintly paler, indistinctly dark-margined, subterminal with two obtuse median teeth; orbicular and reniform darker-outlined, latter partly whitish-edged, with lower extremity dark grey. Hindwings light fuscous, with darker terminal band.

Britain to the Shetlands, Ireland, very common; N. and C. Europe, NW. Asia; 6. Larva pale brown; dorsal line whitish-ochreous; subdorsal indistinctly pale; spiracular pale or whitish, dark-edged above; head and plate of 2 dark brown, whitish-streaked: on wheat-grains, grasses, *Taraxacum*, etc.; 8-3.

21. **H. ochroleuca**, *Esp.* 33-35 mm. Antennae in ♂ triangular-dentate. Forewings light ochreous, more or less brownish-tinged, especially on postmedian band; lines whitish, first and second dentate, closely approximated or connected below middle; median shade grey, indistinct; spots hardly defined, orbicular indistinctly darker-outlined; cilia distinctly barred. Hindwings fuscous-whitish; a broad rather dark fuscous terminal band.

England to York, local; C. Europe, Asia Minor; 8. Larva whitish-green; dorsal and subdorsal lines broad, whitish; subspiracular whitish, dark-edged above; dots black; head pale green: on seeds of *Dactylis;* 5, 6.

22. **H. ophiogramma**, *Esp.* 31-33 mm. Thorax pale brownish-ochreous, with black transverse anterior line. Forewings pale brownish-ochreous; an irregularly triangular dark brown costal patch extending from base to $\frac{4}{5}$ and reaching more than half across wing, lower extremity blackish and edged with whitish suffusion; reniform pale; subterminal line partly brown-edged; a fuscous median terminal spot; a dark fuscous terminal dash above tornus, marked with a whitish subterminal spot. Hindwings pale fuscous, somewhat darker posteriorly.

Britain to Kirkcudbright, N. and E. Ireland, local; C. Europe, NW. Asia; 6, 7. Larva dull pinkish-ochreous; spiracular line whitish; head dark brown; plate of 2 brown: in stems and amongst roots of *Phalaris arundinacea;* 8-5.

23. **H. pabulatricula**, *Brh.* (*connexa*, Bkh.) 31-36 mm. Forewings grey-whitish, anteriorly somewhat mixed with light brown; a black median dash from base, and another from inner margin near base, surrounded by a brown suffusion; median area below a black submedian dash dark brown; orbicular and reniform partly edged with dark fuscous, separated by a brown suffusion; subterminal line faintly brownish-edged. Hindwings fuscous, darker posteriorly.

Norfolk to Kirkcudbright, local; EC. Europe; 6, 7. Larva on *Phalaris arundinacea* (?); 4, 5.

24. **H. leucostigma**, *Hb.* (*fibrosa*, Hb.) 34-37 mm. Forewings brown, coppery-tinged, variable in intensity, lighter towards dorsum and on postmedian band, darkest along termen; lines indistinct; orbicular indistinctly dark-outlined; reniform dark-outlined, more or less whitish-ochreous or whitish

posteriorly, veins 3 and 4 beyond it more or less whitish-dotted. Hindwings light fuscous, darker terminally.

Britain to the Shetlands, N. and W. Ireland, local; C. Europe, N. Asia; 7, 8. Larva dark grey-brown; dorsal and subdorsal lines faintly paler; dots blackish; head dark brown; plate of 2 black; plate of 13 surrounded by a ridge: in hearts of *Cladium mariscus;* 5-7.

25. **H. unanimis,** *Tr.* 29-36 mm. Forewings pale brown mixed with reddish-brown and sprinkled with dark fuscous; an ill-defined black median dash from base, and sometimes one from dorsum near base; lines pale, indistinct, subterminal with two median teeth; orbicular and reniform dark-outlined, more or less pale-edged, posterior edge of reniform whitish. Hindwings light fuscous, with darker terminal suffusion.

Britain to the Orkneys, E. Ireland, rather local; C. Europe; 6, 7. Larva light brown, tinged with ochreous or greenish; dorsal line whitish-ochreous, dark-edged; subdorsal pale, dark-edged; spiracular broad, pale ochreous, dark-edged above; head and plate of 2 brown: on grasses; 8-3.

26. **H. didyma,** *Esp.* (*oculea,* Gn.) 27-33 mm. Forewings brownish-ochreous, reddish-brown, or dark brown, sometimes with a dark brown triangular costal patch extending from base to near apex; sometimes a short black median basal dash; first and second lines indistinct, median band sometimes darker; orbicular usually indistinct; reniform more or less marked with white posteriorly; subterminal line obscurely pale, rather strongly curved below middle, terminal area mostly dark fuscous. Hindwings fuscous, darker terminally.

Britain to the Shetlands, Ireland, very common; N., C., and SE. Europe, Asia Minor; 7, 8. Larva green; dorsal line irregular, double, dull purplish-pink or deep reddish; head brownish: in stems of grasses; 9-5.

27. **H. nictitans,** *Bkh.* 28-35 mm. Forewings light ochreous-brown, sometimes reddish-tinged, darker in disc; lines darker-edged, median shade darker; orbicular small, light, sometimes pale-edged; reniform white or ferruginous-orange, fuscous-marked. Hindwings fuscous, darker posteriorly.

Britain to the Orkneys, Ireland, common; N. and C. Europe, N. Asia, N. America; 8, 9. Larva ochreous-grey or pinkish-grey; dorsal, subdorsal, lateral, and spiracular lines pale greyish-ochreous; head pinkish-ochreous; plate of 2 yellow-brown: on grasses; 6, 7.

28. **H. Haworthii,** *Curt.* 25-29 mm. Forewings purplish-

brown, median band dark brown; median and subdorsal veins and dorsal edge mostly white; an ill-defined blackish median basal mark, and one above dorsum near base; first and second lines pale, dark-edged internally; spots outlined with dark fuscous, orbicular and reniform whitish, brown-centred; postmedian and terminal areas whitish-mixed; subterminal line whitish, edged anteriorly with dark fuscous marks. Hindwings light fuscous, darker posteriorly.

Britain (except SW. England) to the Shetlands, Ireland, common, more local southwards; N. and NC. Europe; 8. Larva pinkish-ochreous to purplish-brown; dorsal and subdorsal lines faintly pale; spots black; head and plate of 2 pale reddish-brown: amongst stem-bases of *Eriophorum;* 6, 7.

29. H. **captiuncula**, *Tr.* (*expolita*, Stt.) 15-18 mm. Forewings light brownish-ochreous, much suffused with reddish-brown; median and terminal areas often mixed with dark fuscous; first and second lines obscurely whitish, more distinct dorsally; orbicular indistinctly pale, reniform whitish-ochreous, both sometimes nearly obsolete; postmedian band sometimes pale. Hindwings dark fuscous.

Lancashire to Durham, W. Ireland, local; EC. Europe, NW. Asia; 7. Larva ochreous, reddish-tinged, dorsally purplish-tinged on 3-8; head reddish-brown; plate of 2 yellow-brown: in hearts of *Carex glauca;* 8-5.

30. **H. literosa**, *Hw.* 24-27 mm. Forewings rosy-grey; median band darker; a darker reddish subdorsal spot at $\frac{1}{3}$; first and second lines internally dark-edged on lower half, second whitish; orbicular and anterior edge of reniform blackish-outlined, orbicular whitish-edged, reniform whitish with grey inner ring; subterminal line obscurely whitish, anteriorly suffusedly edged with brown-reddish. Hindwings fuscous, darker terminally.

Britain to Caledonian Canal, Ireland, rather local; C. Europe, Asia Minor, NW. Asia; 7, 8. Larva ochreous, sometimes pinkish-tinged; space between dorsal and subdorsal lines deep reddish or dark fuscous; head and plate of 2 yellow-brown: in stems of grasses; 9-6.

31. **H. bicoloria**, *Vill.* (*furuncula*, Hb.; *rufuncula*, Hw.) 21-26 mm. Forewings pale brownish-ochreous, more or less suffused with brown, especially on median band; first and second lines on lower half whitish, internally dark-edged; orbicular and anterior edge of reniform dark-outlined, orbicular pale-edged, reniform suffused with white; postmedian band

sometimes whitish-sprinkled; subterminal line obscurely pale, terminal area mixed with dark grey. Hindwings light fuscous, darker posteriorly.

Britain to the Clyde, Ireland, common; N., C., and SW. Europe, Asia Minor, NW. Asia; 7. Larva yellow-ochreous, pinkish-tinged, with three dull reddish bands on each segment; dorsal and subdorsal lines paler; head dark reddish-brown; plate of 2 light reddish-brown: in stems of grasses; 9-6.

32. **H. strigilis**, *Cl.* 24-27 mm. Forewings light brownish-ochreous, more or less mixed or sometimes wholly suffused with rather dark fuscous, sometimes partly rosy-tinged; sometimes a black dash from dorsum near base; first and second lines on lower half often whitish, internally dark-edged, sometimes connected by a thick black submedian dash; orbicular and reniform dark-outlined, sometimes edged with whitish-ochreous or whitish or very indistinct; postmedian band sometimes whitish-mixed; subterminal line obscurely pale. Hindwings fuscous, darker posteriorly.

Britain to Caledonian Canal, Ireland, very common; N. and C. Europe, Asia Minor; 6, 7. Larva dull reddish or fuscous; dorsal, subdorsal, and lateral lines pale ochreous; subspiracular pale ochreous, sometimes blackish-edged above; head and plate of 2 pale brown: on leaves and in stems of grasses and *Carex;* 9-5.

33. **H. fasciuncula**, *Hw.* 21-25 mm. Forewings reddish-ochreous, more or less mixed with fuscous, especially on median band; first and second lines on lower half whitish, internally dark-edged; orbicular and reniform obscurely pale; postmedian band lighter, terminal area more fuscous. Hindwings dark fuscous.

Britain to the Shetlands, Ireland, common; WC. and SW. Europe; 6, 7. Larva pinkish-ochreous; dorsal line double, pale greyish-ochreous, enclosing a darker line; subdorsal and lateral lines pale greyish-ochreous; head and plate of 2 light brown: on leaves and in stems of grasses; 9-5.

36. METACHROSTIS, *Hb.*

Head rough-scaled, face with somewhat appressed scales; eyes glabrous. Antennae in ♂ fasciculate-ciliated. Thorax flat-scaled, with small posterior crest. Abdomen crested towards base.

A genus of moderate extent, distributed throughout the northern hemisphere. The imagos are coloured in imitation of the lichens which they frequent.

1.	Median band suffused with fuscous .	3. *algae.*
	„ „ not fuscous . . .	2.
2.	First line reaching dorsum . .	1. *perla.*
	„ „ not reaching dorsum . .	2. *muralis.*

1. **M. perla**, *F.* 22-27 mm. Forewings ochreous-whitish; costa marked with blackish; lines black, subbasal preceded by a greyish spot, second subdentate, subterminal forming dots; spots grey, sometimes bluish-tinged, orbicular and claviform confluent to form an 8-shaped spot, reniform similar, smaller, whitish-edged; a greyish praesubterminal costal spot; a terminal row of white dots, surrounded by greyish suffusion. Hindwings grey-whitish; discal spot and two suffused posterior lines dark grey.

Britain to Caledonian Canal, Ireland, common; C. and SW. Europe; 7, 8. Larva light bluish-grey; a broad irregular orange or ochreous-yellow dorsal stripe, usually enclosing an interrupted dark grey dorsal line; lateral and spiracular lines sometimes whitish; spots black; head black: on lichens on walls; 10-5.

2. **M. muralis**, *Forst.* (*glandifera*, Hb.; *par*, Hb.; *impar*, Warren) 25-29 mm. Forewings whitish-greenish; costa marked with black; lines black, subbasal preceded by a grey-greenish suffusion dorsally prolonged, first connected with subbasal near dorsum and not reaching dorsum, second and subterminal followed by grey-greenish shades; spots grey-greenish, outlined with black, orbicular and claviform confluent into a transverse blotch. Hindwings light fuscous; discal spot and two suffused posterior lines darker.

England to Caernarvon and Norfolk, W. and S. Ireland, local; C. and S. Europe, Asia Minor; 7, 8. Larva bluish-grey; dorsal line white, irregular, sometimes interrupted; subspiracular pale or yellowish; spots white; head and plate of 2 black: on lichens on walls; 10-5.

3. **M. algae**, *F.* 22-25 mm. Forewings grey-greenish, median band suffused with fuscous; subbasal line black; first and second indicated by some whitish scales, edged internally with blackish; a semicircular dorsal spot outlined with blackish beyond subbasal line; spots hardly darker, orbicular and claviform confluent into a transverse blotch; subterminal line obscurely whitish. Hindwings fuscous, darker terminally.

Cheshire, Lancashire, very scarce; C. and S. Europe, Asia Minor; 7. Larva greenish-grey, whitish-mixed; dorsal line and lateral spots white; dorsal series of black horseshoeshaped marks; spiracular pale, blackish-edged above; head black: on lichens on trees; 10-5.

37. MOMA, *Hb.*

Head rough-scaled; eyes glabrous. Antennae in ♂ ciliated. Thorax with slight anterior and posterior crests, patagia somewhat crested posteriorly. Abdomen with several crests.

Restricted to the single species. Larva with tufts of hairs.

1. **M. orion**, *Esp.* 32-37 mm. Thorax pale green marked with black, collar black edged with white. Forewings pale green; irregular median and submedian streaks and costal edge white; first and second lines widely remote, thick, irregular, black, second posteriorly irregularly edged with fuscous; a black mark on middle of costa; spots partly strongly outlined with black; black subterminal marks in middle and above tornus; a terminal row of black anteriorly white-edged spots; cilia barred. Hindwings light fuscous, darker posteriorly; two whitish tornal marks.

Kent to Cornwall, Suffolk, Norfolk, Durham, local; N. and C. Europe; 6. Larva brownish-ochreous, with several irregular yellowish lines, dorsally black on 4-12; pale yellow or whitish transverse dorsal blotches on 5, 7, and 10; reddish tubercles bearing tufts of brown or whitish hairs; head black, yellowish-marked: on oak, birch, beech, etc.; 7-9.

38. ACRONYCTA, *O.*

Head rough-scaled; eyes glabrous. Antennae in ♂ very minutely ciliated. Thorax with slight posterior crest. Abdomen with slight ill-defined hairy crests towards base.

A rather small genus, characteristic of the European region and N. America. Ova in species 1-8 deposited singly, in remainder in overlapping rows. Larvae remarkably diversified, but usually more or less hairy, often conspicuously decorated. Pupa in cocoon, or cavity in dead wood, etc.; in species 9-12 with segmental margins forming rounded ridges.

1. Dorsal half of forewings blackish . 2. *alni.*
   ,, ,, ,, not blackish . . 2.
2. Median band with black subdorsal dash . 3. *strigosa.*
   ,, ,, without such dash . . . 3.
3. Second line marked with white subdorsal spot 9. *rumicis.*
   ,, ,, without white spot . . . 4.
4. Forewings partly greenish-tinged . 8. *ligustri.*
   ,, not greenish-tinged . . . 5.

5.	Forewings more or less sprinkled with dark fuscous	6.
	,, not sprinkled with dark fuscous	11.
6.	Black basal dash tolerably defined	7.
	,, ,, ,, nearly obsolete	10.
7.	Hindwings white	8.
	,, at most whitish anteriorly	9.
8.	First line distinct towards costa only	1. *leporina.*
	,, ,, ,, throughout	7. *aceris.*
9.	Subterminal line whitish	10. *auricoma.*
	,, obsolete	12. *menyanthidis.*
10.	Reniform broadly pale-suffused	6. *megacephala.*
	,, not pale-suffused	11. *euphorbiae.*
11.	Forewings tinged with rosy-purplish	4. *tridens.*
	,, not so tinged	5. *psi.*

1. **A. leporina**, *L.* 37-44 mm. Forewings whitish, sprinkled with dark fuscous; a short black median basal dash; first line indicated by a black mark on costa and traces elsewhere, median by a strong black costal mark, second black, waved, interrupted; small orbicular and narrow reniform indistinctly blackish-outlined; base of cilia black-spotted. Hindwings white.

Britain to Sutherland, E. and S. Ireland, not common; N. and C. Europe, N. Asia; 6. Larva green or greenish-yellow; sometimes obscure red-brownish dorsal and lateral suffusions; numerous very long white or yellowish hairs, directed forwards on right side and backwards on left; sometimes dorsal tufts of black hairs; head sometimes black-marked: on alder, birch, elm, *Salix;* 7-9.

2. **A. alni**, *L.* 37-42 mm. Thorax grey-whitish, with a black lateral stripe. Forewings grey-whitish, irregularly mixed with pale brownish; dorsal half blackish from base to tornus, united with a broad blackish-fuscous median fascia; first and second lines blackish; reniform indistinctly indicated; subterminal line obscurely pale; a black dash before termen above middle. Hindwings white, termen fuscous-sprinkled.

England to York, E. Ireland, scarce; C. Europe; 6, 7. Larva black; a series of transverse yellow bands; 2 with four, 5-10, 12, 13 each with two long black hairs with broadly flattened tips; head black: on alder, birch, beech, *Cornus*, etc.; 7-9. When young, the larva is quite different, being whitish, with 5-10 suffused with slaty-grey, 5-9 subprominent above; in this stage it usually rests with the head bent round against 9, and closely resembles a patch of bird's excrement. In the final stage the larva can emit a strong probably protective odour, resembling carburetted hydrogen; its black and yellow bands are therefore, as usual, a warning signal.

3. **A. strigosa**, *F.* 28-31 mm. Forewings ochreous-whitish, sprinkled with brown; costa spotted with dark fuscous; an ochreous-yellow blackish-edged spot towards base of dorsum; a black submedian streak from base to termen, interrupted on median band, and a black subdorsal dash on median band; first and second lines whitish, partly edged with dark fuscous; orbicular and reniform suffusedly pale-edged, partly outlined with blackish, separated by a dark fuscous suffusion. Hindwings fuscous-whitish, termen fuscous-suffused; a pale fuscous discal spot.

Norfolk, Cambridge, local; C. Europe, N. Asia; 6, 7. Larva green, seldom purple-brown; an irregular dorsal crimson-brown stripe; scattered blackish, ochreous, and whitish hairs; 12 with dorsal prominence; head dark brown: on hawthorn; 7-9.

4. **A. tridens**, *Schiff.* 33-39 mm. Differs from *A. psi* only as follows: forewings slightly darker, faintly tinged with rosy-purplish; median costal mark rather more oblique.

Britain to Caledonian Canal, E. and W. Ireland, local; N. and C. Europe, N. Asia; 6, 7. Larva black; a broad white dorsal stripe, including a series of orange spots; lateral series of reddish marks and white tubercles; spiracular line broad, whitish; 5 and 12 with dorsal prominences, 5 with a tuft of black hairs; numerous long blackish, whitish, and yellowish hairs; head black: on hawthorn, oak, birch, etc.; 8-10.

5. **A. psi**, *L.* 35-41 mm. Forewings grey-whitish densely irrorated with light brown; a black median basal streak reaching first line, emitting three short projections; first line edged with dark fuscous; orbicular and reniform partly black, outlined, almost or quite touching; a dark fuscous median costal mark touching their junction; second line obscurely whitish, blackish-edged posteriorly; a fine black dash beyond this above middle, and a stronger one traversing it above tornus. Hindwings whitish, more or less fuscous-sprinkled posteriorly; sometimes a fuscous postmedian line.

Britain to Ross, Ireland, very common; Europe, N. and WC. Asia, N. Africa; 5, 6. Larva blackish or slaty-grey; a broad pale yellowish or whitish dorsal stripe; lateral series of orange or reddish marks; spiracular line broad, whitish;

5 with long narrow dorsal blackish prominence, 12 with a smaller prominence; numerous ochreous, whitish, and blackish hairs; head black: on plum, rose, birch, etc.; 7-9.

6. **A. megacephala**, *F.* 40-42 mm. Forewings ochreous-grey-whitish, irrorated with blackish; second and subterminal lines more whitish, median shade and margins of first, second, and subterminal lines formed by denser cloudy irroration; orbicular and reniform more or less pale-suffused, darker-outlined. Hindwings whitish, towards termen and on veins more or less sprinkled with dark fuscous.

Britain to Ross, Ireland, common; Europe, Asia Minor, N. Asia; 6, 7. Larva dark fuscous or grey above, paler laterally; numerous pale yellowish pubescent dots, tending to form several lines; 11 with a pale yellow or white dorsal patch; numerous mostly pale or whitish hairs; head black, whitish-marked: on poplar, or seldom *Salix;* 7-9.

7. **A. aceris**, *L.* 40-44 mm. Forewings whitish, irrorated with greyish-ochreous scales tipped with blackish; an ill-defined slender branched blackish median basal streak to beyond first line; first and second lines dark-edged, second followed by a brownish shade; median line fuscous, more distinct towards costa, traversing reniform; orbicular round, blackish-outlined; reniform indistinctly dark-outlined. Hindwings white; veins and termen more or less irrorated with dark fuscous.

England to Lancashire, N. and W. Ireland, not uncommon; Europe, Asia Minor; 6, 7. Larva red-brown or blackish, whitish-freckled; dorsal series of white black-edged diamonds; numerous very long yellow hairs; head black: on horse-chestnut, sycamore, oak, etc.; 7-9.

8. **A. ligustri**, *F.* 35-41 mm. Forewings rather dark purplish-ashy-fuscous, partly tinged with dull olive-green, with a few white scales; subbasal, first, and second lines edged with black, subbasal ending in a short black dash; orbicular white-edged, black-outlined, surmounted by a whitish costal suffusion; claviform partly white-edged; reniform black-outlined, posteriorly strongly white-edged, followed by a suffused white blotch; subterminal line partly white. Hindwings fuscous, faintly greenish-tinged.

Britain to Ross, Ireland, rather common; N. and C. Europe; 6, 7. Larva pale, bluish-green, beneath yellowish-green; dorsal line whitish; lateral pale yellowish; spiracles red; dots black, bearing single rather long black hairs; head green: on ash (seldom privet, alder, etc.); 7-9.

9. **A. rumicis**, *L.* 34-40 mm. Forewings fuscous, mixed with whitish, and irregularly irrorated with dark fuscous; subbasal, first, and second lines blackish-edged, second marked with a white subdorsal spot; median line dark fuscous, only distinct towards costa; orbicular and reniform blackish-outlined; subterminal line whitish. Hindwings fuscous, darker towards termen.

Britain to Ross, Ireland, common; Europe, N. and WC. Asia, N. Africa; 5, 6. Larva rather dark brown-grey, paler-marbled; dorsal series of black blotches enclosing orange-red spots; subdorsal series of white spots; subspiracular line waved, white or pale yellowish, marked with orange-red tubercles; fascicles of pale ochreous or reddish mixed with dark fuscous hairs; 5 and 12 somewhat prominent above; head black, streaked with brownish-ochreous: on *Polygonum*, *Salix*, hawthorn, *Veronica*, etc.; 8, 9.

10. **A. auricoma**, *F.* 35-39 mm. Forewings fuscous, mixed with whitish and irrorated with black; an ill-defined black median basal streak to first line; base of dorsum whitish-ochreous; first line indistinctly blackish-edged; orbicular and reniform blackish-outlined, space between them pale; second line black; subterminal whitish; sometimes a blackish streak above tornus. Hindwings light fuscous, in ♂ more whitish anteriorly.

Kent to Hants, local; N. and C. Europe, Asia Minor, N. Asia; 5, 8. Larva black, incisions greyer; 3-13 each with two or four orange-reddish tubercles, bearing fascicles of orange hairs; other hairs blackish; head and plate of 2 black: on oak, birch, *Rubus*, etc.; 6, 7, 9-4.

11. **A. euphorbiae**, F. (*myricae*, Gn.) 31-37 mm. Forewings fuscous, mixed with whitish and irrorated with dark fuscous; indications of a blackish median basal streak; first and second lines edged internally with darker, externally with blackish; median line darker; orbicular and reniform blackish-outlined; subterminal line faintly paler. Hindwings in ♂ white, veins fuscous; in ♀ rather dark fuscous, cilia white.

Ayr to Ross, S. Ireland, local; Europe, Asia Minor, N. Asia; 6. Larva black, incisions more greenish-grey, sometimes mostly suffused with whitish; subdorsal series of whitish or pale yellow trilobed spots; subspiracular line orange-red; 3 with orange-red transverse band; fascicles of black hairs mixed with whitish; head black: on *Myrica*, *Erica*, birch, etc.; 8, 9.

12. **A. menyanthidis**, *View.* (*salicis*, Curt.) 33-37 mm. Forewings fuscous, almost wholly suffused with grey-whitish, somewhat sprinkled with dark fuscous; an irregular blackish median basal streak to first line; first line indistinctly dark-edged; median shade obscurely darker; orbicular and reniform dark-outlined, sometimes almost obsolete; second line whitish, posteriorly edged with dark fuscous, usually traversed by a short dark fuscous submedian mark; terminal area sometimes darker. Hindwings light fuscous, darker terminally.

Norfolk and Shropshire to Ross, N. and W. Ireland, local; N. and C. Europe; 6. Larva blackish-brown or black; subspiracular line dull reddish or crimson, sometimes interrupted; fascicles of pale reddish-brown to black hairs; head black: on *Myrica*, *Calluna*, *Salix*, etc.; 8, 9.

39. ARSILONCHE, *Ld.*

Head rough-haired; eyes glabrous. Antennae in ♂ minutely ciliated. Palpi rather short, porrected, densely rough-haired. Thorax densely hairy, not crested. Abdomen not crested.

Limited to include the single species only; it is closely correlated with the preceding.

1. **A. albovenosa**, *Gz.* (*venosa*, Bkh.) 33-37 mm. Forewings whitish-ochreous, sometimes sprinkled with dark fuscous; indistinct brownish median, submedian, and dorsal streaks; sometimes blackish terminal dots. Hindwings white.

Herts to Norfolk, in marshes, local; C. and SE. Europe, N. America; 6. Larva blackish or dark brown-grey, pale-marbled; subdorsal and subspiracular lines pale ochreous-yellowish, often reddish-marked; tubercles on these yellow or orange; fascicles of pale reddish-brown and black hairs; head black, streaked with ochreous: on reed (*Phragmites*), *Carex*, *Typha*, etc.; 8, 9.

3. PLUSIADAE.

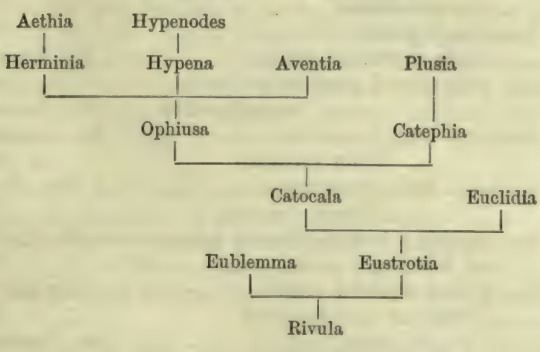
Ocelli usually distinct. Tongue well-developed. Posterior tibiae with all spurs present. Forewings: 7 and 8 usually out of 9, 10 usually connected with 9. Hindwings: 3 and 4 connate or short-stalked, 5 well-developed, 6 and 7 connate or short-stalked or seldom closely approximated only, 8 shortly anastomosing with cell near base, thence evenly diverging.

This family is by no means very prominent in temperate regions, but within the tropics it assumes immense proportions and is there probably the most abundant family of the *Lepidoptera*. There is much greater diversity of size, colour, and form than in the *Caradrinidae*, and also more variation in structure, though this remains more uniform than usual. Imago with forewings usually relatively broader and less elongate than in the *Caradrinidae*, body often more slender.

Ovum spherical, more or less reticulated, often also ribbed. Larva with few hairs, sometimes with prolegs on 7 and 8 absent or rudimentary. Pupa usually in a cocoon above ground.

The following diagram shows the phylogeny of the principal genera :—

PHYLOGENY OF PLUSIADAE.


Aethia
Hypenodes
Herminia
Hypena
Aventia
Plusia
Ophiusa
Catephia
Catocala
Euclidia
Eublemma
Eustrotia
Rivula

TABULATION OF GENERA.

1.	Hindwings with 5 parallel to 4	2.
	,, ,, 5 more or less approximated to 4	10.
2.	Forewings with 7 absent	4. SCHRANKIA.
	,, ,, all veins present	3.
3.	Forewings with 7 separate	5. HYPENODES.
	,, ,, 7 out of 9	4.
4.	Antennae in ♂ bipectinated	5.
	,, ,, not bipectinated	6.
5.	Palpi porrected	1. BOLETOBIA.
	,, ascending	3. HERMINIA.
6.	Abdomen with small crest near base	7.
	,, not crested	8.
7.	Eyes ciliated	6. BOMOLOCHA.
	,, not ciliated	7 HYPENA.

8.	Palpi long	2. AETHIA.
	,, moderate	9.
9.	Tibiae loosely haired	9. AVENTIA.
	,, smooth-scaled	8. COLOBOCHYLA
10.	Middle tibiae spinose	11.
	,, ,, not spinose	13.
11.	Anterior tibiae spinose	16. EUCLIDIA.
	,, ,, not spinose	12.
12.	Abdomen somewhat crested towards base	15. CATOCALA.
	,, not crested	14. PHOBERIA.
13.	Antennae in ♂ bipectinated	11. SCOLIOPTERYX.
	,, ,, not bipectinated	14.
14.	Abdomen crested	15.
	,, not crested	17.
15.	Tibiae rough-scaled	16.
	,, with appressed scales	17. ERASTRIA.
16.	Palpi with second joint rough-scaled	12. PLUSIA.
	,, ,, ,, smooth-scaled	13. CATEPHIA.
17.	Forewings with 7 separate	21. EUBLEMMA.
	,, ,, 7 not separate	18.
18.	Forewings with 10 separate	22. RIVULA.
	,, ,, 10 not separate	19.
19.	Face forming a rounded horny prominence	20. EMMELIA.
	,, not forming a prominence	20.
20.	Thorax with anterior crest	10. OPHIUSA.
	,, without anterior crest	21.
21.	Thorax rough-haired	19. PANEMERIA.
	,, smooth-scaled	18. EUSTROTIA.

Sub-Fam. 1. *HYPENIDES.*

Vein 5 of hindwings parallel to 4.

1. BOLETOBIA, *B.*

Head with appressed scales. Antennae in ♂ bipectinated to apex. Palpi long, straight, porrected, rough-scaled throughout. Thorax smooth-scaled. Abdomen not crested. Tibiae smooth-scaled. Hindwings: 5 parallel to 4.

Only the one species is known; it frequents dark damp buildings, and is very retired in habit. Larva without prolegs on 7 and 8 (?). Pupa in a cocoon covered with refuse.

1. **B. fuliginaria**, *L.* 23-29 mm. Forewings dark fuscous; first and second lines pale ochreous, internally dark-edged, second dentate; a darker discal mark; subterminal line pale ochreous, subdentate. Hindwings as forewings, but first line obsolete.

Kent, Sussex, Middlesex, Worcester, scarce and local; N. and C. Europe, Asia Minor, N. Asia; 7. Larva blackish; dorsal and supraspiracular dots orange: on fungus (a blackish species of the family *Muscedines*) growing on rotten wood; 5, 6.

2. AETHIA, *Hb.*

Head loosely scaled, with frontal tuft. Antennae in ♂ ciliated, with long bristles at joints, sometimes with a thickening below middle. Palpi long or very long, ascending or recurved, thickened with tolerably appressed scales, terminal joint loosely scaled above, pointed. Thorax smooth-scaled. Abdomen not crested. Tibiae with appressed scales; anterior tibiae in ♂ sometimes with long expansible hair-pencil. Hindwings: 5 parallel to 4.

Includes a few species inhabiting temperate portions of the northern hemisphere. Pupa in a slight cocoon.

1. Forewings with entire dark fuscous subterminal line 2.
,, without such line . . . 3.
2. Subterminal line running to apex . . 3. *nemoralis.*
,, ,, ,, to costa 2. *tarsipennalis.*
3. First and second lines whitish-ochreous . 1. *emortualis.*
,, ,, ,, dark brown . 4. *derivalis.*

1. **A. emortualis**, *Schiff.* 23-27 mm. Forewings pale ochreous finely sprinkled with brown; first and second lines hardly curved, whitish-ochreous; a whitish-ochreous discal mark. Hindwings as forewings, but first line absent.

S. England to Oxford and Essex, scarce and local; C. Europe, N. Asia; 6, 7. Larva without developed prolegs on 7: on oak; 9, 10.

2. **A. tarsipennalis**, *Tr.* 27-30 mm. Antennae in ♂ with a thickening below middle. Anterior tibiae in ♂ with long hair-pencil. Forewings light brown; first and second lines dark fuscous, first curved, second sinuate-curved; a curved dark fuscous discal mark; subterminal line straight, dark fuscous, pale-edged posteriorly. Hindwings pale fuscous; a bent dark fuscous posteriorly pale-edged subterminal line.

Britain to the Clyde, W. Ireland, common; C. Europe, N.

Asia; 7. Larva brown-grey, darker-freckled; dorsal line blackish-grey, interrupted; subdorsal paler, interrupted; lateral series of blackish marks; dots black; head and plate of 2 darker: on *Salix*, *Rubus*, *Polygonum*, etc.; 9-4.

3. **A. nemoralis**, *F.* (*grisealis*, Hb.) 21-26 mm. Anterior tarsi in ♂ absent. Forewings ochreous irrorated with brown; first and second lines dark fuscous, first straight, second strongly curved on upper half; a dark fuscous discal mark; subterminal line somewhat curved inwards, dark fuscous, running to apex. Hindwings light fuscous; a bent darker subterminal line.

England to York, N. and E. Ireland, common; C. Europe, N. Asia; 6, 7. Larva dull pinkish-grey, darker-freckled; dorsal line broad, blackish; subdorsal darker; dots blackish; head and plate of 2 dark brown: on oak, *Sisymbrium*, etc.; 8, 9.

4. **A. derivalis**, *Hb.* 23-27 mm. Forewings ochreous irrorated with brown; first and second lines curved, dark brown; a dark brown discal mark; subterminal line curved, obscurely pale or obsolete, sometimes partly edged anteriorly with dark brown. Hindwings as forewings, but first line absent, second less curved, subterminal more obsolete.

Kent, Sussex, Essex, local; C. Europe, Asia Minor, N. Asia; 7, 8. Larva dark brown; dorsal line faintly darker; dots black; head and plate of 2 darker: on fallen leaves of oak, *Salix*, etc.; 8-6.

3. HERMINIA, *Latr.*

Head loosely scaled, with frontal tuft. Antennae in ♂ bipectinated, with a thickening below middle. Palpi very long, obliquely ascending, thickened with rough scales, second joint very long, straight, terminal rather short, pointed. Thorax smooth-scaled. Abdomen not crested. Tibiae with appressed scales; anterior tibiae in ♂ with large expansible hair-pencil. Hindwings: 5 parallel to 4.

The species are few, and inhabit northern temperate regions, principally N. America. Pupa in a slight cocoon.

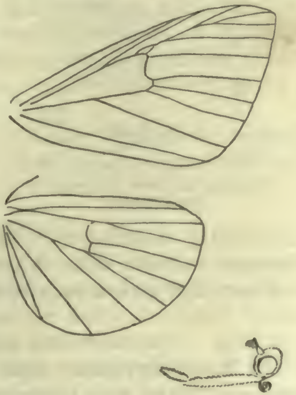
Forewings with lines entire . . . 2. *barbalis.*
" " reduced to series of marks 1. *cribralis.*

1. **H. cribralis**, *Hb.* 23-26 mm. Antennal pectinations of ♂ long. Forewings whitish-ochreous, thinly brown-sprinkled; first and second lines forming series of short cloudy dark fuscous marks, subterminal a series of indistinct dark fuscous dots; a

black discal dot. Hindwings fuscous-whitish, terminally brownish-tinged; a grey discal dot.

S. England to Somerset and Lincoln, in marshy places, local; C. Europe, N. Asia; 7. Larva pale grey-brown, yellowish-freckled; dorsal line darker, pale-edged; subdorsal and spiracular paler: on *Salix*, *Carex*, *Luzula*, etc.; 9-5.

2. **H. barbalis**, *Cl.* 27-31 mm. Antennal pectinations of ♂ very short, terminating in long bristles. Forewings pale greyish-ochreous irrorated with dark brown; first and second lines cloudy dark yellowish-brown, somewhat sinuate, bent near costa; an ill-defined darker discal mark; subterminal line cloudy, dark brown, nearly straight. Hindwings whitish irrorated with fuscous except towards costa and apex; obscure darker fuscous second and subterminal lines.



Neuration and head of *Herminia barbalis*.

England to York, common; N. and C. Europe, Asia Minor; 5-7. Larva dull reddish-ochreous; dorsal, subdorsal, and lateral series of darker-freckled diamonds; head fuscous: on birch and oak; 8-4.

4. Schrankia, *Hb.*

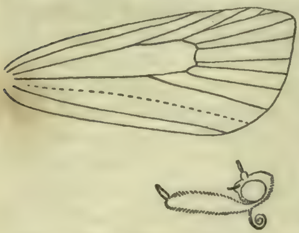
Head smooth-scaled. Antennae in ♂ ciliated. Palpi long, recurved, smooth-scaled, second joint thickened, terminal moderately long, pointed. Thorax smooth-scaled. Abdomen not crested. Tibiae smooth-scaled. Forewings: 7 absent, 8 separate, 9 and 10 stalked. Hindwings: 5 parallel to 4.

Includes only the single species.

1. **S. turfosalis**, *Wk.* 13-14 mm. Forewings whitish-ochreous, irregularly irrorated with brown and dark fuscous; first line indistinctly indicated; second irregular, oblique, dark fuscous, posteriorly whitish-edged; a small dark fuscous discal spot, white-edged posteriorly; subterminal line straight, oblique, ill-defined, whitish, preceded by a dark fuscous suffusion, running to apex. Hindwings grey.

Britain to Perth, S. Ireland, in marshy places, local; NC. Europe; 7.

5. Hypenodes, *Gn.*



Forewing and head of *Hypenodes costistrigalis.*

Head loosely scaled, with small frontal tuft. Antennae in ♂ ciliated. Palpi very long, porrected, second joint thickened with rough projecting scales, terminal rather short, cylindrical. Thorax with appressed scales. Abdomen with small crest near base. Tibiae smooth-scaled. Forewings: 7 separate, 9 and 10 out of 8. Hindwings: 5 parallel to 4.

Although consisting of very few species, this genus is almost universally distributed. Imago with forewings unusually elongate. Larva without prolegs on 7 and 8.

Forewings with a dark suffusion beyond discal spot 1. *costistrigalis.*
,, without such suffusion . . 2. *albistrigalis.*

1. **H. costistrigalis,** *Stph.* 18-19 mm. Forewings whitish-ochreous mixed with brown and dark fuscous, lighter dorsally; a fine black dash beneath costa at base; first line partly blackish-marked, dentate; second line oblique, irregular, partly marked with dark fuscous and edged posteriorly with whitish; a small blackish discal spot, connected with second line by a dark fuscous suffusion; subterminal line indistinctly pale. Hindwings fuscous-whitish; a grey discal dot.

England to Cumberland, local; C. Europe; 7, 8. Larva dark purple-brown; dorsal line slightly paler; subdorsal obscurely pale, blackish-edged beneath; sides more ochreous: on flowers of *Thymus* (in captivity only, natural food unknown); 7, 8.

2. **H. albistrigalis,** *Hw.* 17-20 mm. Forewings brown; a fine black dash beneath costa at base; first line partly blackish-marked, dentate; second blackish, posteriorly whitish-edged, towards costa indistinct, on lower half straight and conspicuous; an indistinct dark fuscous discal spot, posteriorly pale-edged; subterminal line indistinctly pale. Hindwings light grey.

England to York, local; France; 6, 7.

6. Bomolocha, *Hb.*

Characters of *Hypena*, but eyes ciliated.

The genus is fairly numerous in N. America; the single European species would appear to be a straggler.

1. **B. fontis,** *Thnb.* (*crassalis*, F.) 26-31 mm. Forewings dark brown, beyond second line pale ochreous; a pale ochreous dorsal band mixed with ochreous-brown and suffused above with white; orbicular represented by a dark fuscous dot, reniform by a suffused mark; second line irregular, white, sharply angulated above middle; subterminal formed by suffused blackish dots, posteriorly white-edged; an oblique dark brown apical streak. Hindwings fuscous, faintly reddish-tinged; a darker discal dot.

S. England to Suffolk and Merioneth, W. and S. Ireland, local; N. and C. Europe; 6, 7. Larva green; dorsal and subdorsal lines darker: on *Erica;* 7-9.

7. HYPENA, *Schrk.*

Head loosely scaled, with frontal tuft. Antennae in ♂ ciliated. Palpi very long, porrected or subascending, second joint thickened with rough projecting scales, terminal rough-scaled, ascending, pointed. Thorax smooth-scaled. Abdomen with small crest near base. Tibiae with appressed scales. Hindwings: 5 parallel to 4.

A large genus of almost universal distribution, most plentiful within the tropics. Larva without prolegs on 7; feeding on species of *Urticaceae.* Pupa in a slight cocoon.

1. Orbicular forming a raised tuft . . . 2.
,, not forming a raised tuft 2. *proboscidalis.*
2. Second line with angular median projection 3. *obsitalis.*
,, ,, without angular projection . 1. *rostralis.*

1. **H. rostralis,** *L.* 26-29 mm. Forewings rather narrow, pale brown, more or less mixed with darker fuscous, especially on median band; first and second lines dark fuscous, sometimes obsolete, first irregular, second almost straight; orbicular and reniform represented by tufts of raised scales, sometimes connected by a blackish dash; subterminal line obscurely pale; usually a suffused oblique dark fuscous apical streak. Hindwings light fuscous.

Britain to Roxburgh, local; N. and C. Europe, N. and WC. Asia; 7-5. Larva bright green; dorsal line darker; subdorsal clear white; spiracular white, interrupted, less distinct; dots black; head yellowish-green, black-dotted: on *Humulus;* 5, 6.

2. **H. proboscidalis,** *L.* 33-37 mm. Forewings with apex

prominent; light brown, indistinctly strigulated with dark fuscous; first and second lines dark brown, first curved, indented above middle, second hardly curved, preceded by a dark suffusion; subterminal indicated by a few whitish dots, edged anteriorly by a dark suffusion; a dark terminal suffusion beneath apex. Hindwings light fuscous.

Britain to Ross, Ireland, very common; N., C., and SE. Europe, N. and WC. Asia; 6, 7. Larva green; dorsal line darker; subdorsal pale: on *Urtica;* 7-4.

3. **H. obsitalis,** *Hb.* 25-28 mm. Forewings ochreous-brown, with some indistinct darker strigulae; sometimes a large dark fuscous triangular blotch occupying upper $\frac{2}{3}$ of median band; spots represented by tufts of raised scales, partly dark fuscous; second line obscurely pale or whitish, irregular, with a short angular median projection, towards costa followed by a pale suffusion; subterminal indicated by some whitish dots, towards costa preceded by dark fuscous marks. Hindwings rather dark grey.

Dorset, once only, probably scarce and local; S. Europe, Asia Minor to Syria, N. Africa; 7-4. Larva resembling that of *H. proboscidalis:* on *Parietaria* and *Urtica;* 5, 6.

8. COLOBOCHYLA, *Hb.*

Head smooth-scaled, with frontal tuft. Antennae in ♂ strongly ciliated. Palpi moderately long, subascending, second joint thickened with tolerably appressed scales, terminal rather short, obtuse. Thorax smooth-scaled. Abdomen not crested. Tibiae smooth-scaled. Hindwings: 5 parallel to 4.

A small but widely distributed genus, apparently correlated with the preceding and following. Larva without prolegs on 7, those on 8 rudimentary. Pupa in a slight cocoon.

1. **C. salicalis,** *Schiff.* 26-31 mm. Forewings fuscous very finely irrorated with whitish, appearing grey; lines ferruginous-brown, first straight, second and subterminal slightly curved inwards, edged anteriorly with whitish-ochreous, subterminal running to apex. Hindwings pale fuscous, darker terminally; a faint subterminal line.

Kent, Surrey, Suffolk, scarce and local; C. Europe, WC. Asia to N. Persia; 6, 7. Larva green, incisions yellowish; spiracles black; head green: on *Salix;* 5, 6.

9. AVENTIA, *Dup.*

Head with appressed scales, with slight frontal tuft.

Antennae in ♂ ciliated. Palpi moderate, porrected, second joint thickened with dense scales, terminal very short, obtuse. Thorax smooth-scaled. Abdomen not crested. Tibiae loosely haired. Hindwings: 5 parallel to 4.

Includes only the single species. Imago with upper half of termen of forewings rather abruptly concave. Larva with prolegs on 7 and 8 much shorter; a subspiracular ridge bearing fleshy filaments.

1. **A. flexula**, *Schiff.* 25-32 mm. Head and collar light yellow-brown. Forewings rosy-grey-whitish, sprinkled with black; first and second lines whitish-ochreous, edged on both sides with brown, angulated near costa; reniform represented by two black dots transversely placed; subterminal line obscurely pale; a pale ferruginous terminal suffusion, becoming deeper on upper half of termen, leaving a small whitish apical suffusion; a blackish apical spot in cilia. Hindwings ochreous-whitish, blackish-sprinkled; second line fuscous-edged, straight.

England to York, local; C. Europe; 6, 7. Larva pale bluish-green, sometimes ochreous-tinged; dorsal line darker green, black-edged near incisions; subdorsal pale, edged above with black, below with darker green; 9 and 10 darker; dots black; head whitish-green, black-dotted: on lichens on tree-trunks; 4, 5.

Sub-Fam. 2. *PLUSIADES.*

Vein 5 of hindwings more or less approximated to 4.

10. Ophiusa, *O.*

Head rough-scaled, with frontal tuft. Antennae in ♂ ciliated. Palpi moderate, ascending, rough-scaled beneath throughout, terminal joint short, obtuse. Thorax with anterior crest. Abdomen not crested. Tibiae rough-scaled. Hindwings: 5 somewhat approximated to 4.

A rather limited genus, occurring throughout the northern hemisphere and in Australia. Larva with prolegs on 7 and 8 somewhat shorter. Pupa in a cocoon.

Costa with several dark brown spots .	2. *craccae.*
„ not spotted	1. *pastinum.*

1. **O. pastinum**, *Tr.* 37-43 mm. Head above and collar deep brown. Forewings pale fuscous, tinged with ochreous-brown especially on costa and terminal area, and indistinctly strigulated with darker; first and second lines indistinctly

brownish, subterminal suffusedly brownish-edged; dot-like orbicular, transverse reniform narrowed above, and one or two dots beyond it very dark brown. Hindwings light fuscous, ochreous-tinged, darker posteriorly.

England to York, local; C. Europe, N. Asia; 6, 7. Larva purple-pinkish, more whitish laterally, sprinkled with red-brownish; dorsal, subdorsal, and spiracular lines orange, edged with white: on *Vicia cracca;* 5.

2. **O. craccae**, *F.* 39-45 mm. Head above and collar deep brown. Forewings whitish-grey, indistinctly brownish-strigulated, more strongly posteriorly, veins pale; subbasal, first, median, and second lines indicated by small dark brown spots on costa; orbicular forming a minute black dot; reniform narrow, crescentic, partly black-edged, especially anteriorly; subterminal line hardly paler, preceded by a darker suffusion towards costa. Hindwings pale yellowish-fuscous; a suffused darker fuscous terminal band.

Devon, local; C. and S. Europe, WC. Asia to Turkestan; 7. Larva dark brown, becoming brownish-ochreous laterally; dorsal line dark brown, pale-edged; subdorsal double, brown; lateral double, dark brown: on *Vicia sylvatica*, *V. sepium*, etc.; 5, 6.

11. SCOLIOPTERYX, *Germ.*

Head rough-haired, with frontal tuft. Antennae in ♂ bipectinated to apex. Palpi rather long, ascending, with dense loose scales, terminal joint rather long, cylindrical. Thorax with collar forming a prominent hood, crested in middle. Abdomen slightly crested near base. Tibiae rough-scaled; posterior tarsi in ♂ with two flat scale-tufts on basal joint. Hindwings: 5 somewhat approximated to 4.

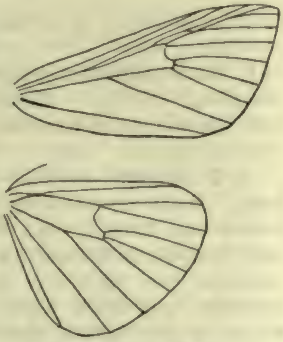
Contains only the single species; it is a development from the group of *Phoberia*, but is rather widely remote from any European form. Imago with termen of forewings irregularly dentate, concave on upper half. Pupa in a white cocoon.

1. **S. libatrix**, *L.* 42-46 mm. Forewings greyish-ochreous strigulated with fuscous, posteriorly rosy-tinged, veins posteriorly whitish; a short subcostal streak at base, and an irregular median suffusion extending from base to middle orange-reddish mixed with yellow; a white median basal dot, and another representing orbicular; reniform sometimes represented by two black dots; first and second lines more or less pale, fuscous-edged, second double; some white dots or suffused

spots on costa posteriorly. Hindwings rather dark fuscous, lighter basally.

Britain to the Shetlands, Ireland, common; N. and C. Europe, N. and WC. Asia to Turkestan, N. America; 8-5. Larva green; dorsal line darker, indistinct; spiracular pale, darker-edged above; spiracles yellow, brown-edged; head green: on *Salix* and hawthorn; 5-7.

12. Plusia, *O.*


Neuration of *Plusia gamma.*

Head rough-scaled. Antennae in ♂ very shortly ciliated. Palpi rather long, curved, ascending, second joint rough-scaled, terminal moderately long or short, more or less rough-scaled in front, somewhat pointed. Thorax with large central or posterior crest. Abdomen with one or more crests. Tibiae rough-scaled. Hindwings: 5 more or less approximated to 4.

A considerable genus, occurring throughout the world. Most of the imagos are handsome insects, often with metallic markings; some of them fly actively in bright sunshine. Larva usually without prolegs on 7 and 8 (but these are developed in *tripartita* and *triplasia*), 12 more or less prominent above. Pupa in a rather open cocoon.

1. Forewings with two broad brassy fasciae . 2. *chrysitis.*
„ without such fasciae . . . 2.
2. Orbicular and claviform forming an 8-shaped silver-edged blotch 1. *moneta*
„ „ not so formed . 3.
3. Forewings with large brassy postmedian blotch 3. *orichalcea.*
„ without brassy postmedian blotch . 4.
4. Forewings with triangular brassy median blotch 4. *bractea.*
„ without such blotch . . . 5.
5. Forewings with one or two shining pale discal spots . . . . 6.
„ without such spots . . . 12.

6. Forewings with brassy-white subapical suffusion 5. *festucae.*
,, without such suffusion . . 7.
7. Forewings light dull rosy . . 6. *iota.*
,, not rosy . . . . 8.
8. Reniform partly silvery-outlined . . . 9.
,, not silvery-outlined . . . 10. *ni.*
9. Forewings with orange subdorsal postmedian suffusion . . 7. *pulchrina.*
,, without such suffusion . . 10.
0. Second discal spot separate or forming short projection of first . . 11.
,, ,, forming rather long projection of first . . 8. *gamma.*
11. Discal suffusion golden-brown . . 9. *chalcites.*
,, ,, dark fuscous . 11. *interrogationis.*
12. Basal area of forewings brownish-ochreous 13. *triplasia.*
,, ,, not ochreous . 12. *tripartita.*

1. **P. moneta,** *F.* 36-38 mm. Terminal joint of palpi rather long. Forewings shining pale golden, sprinkled with ochreous-brown and black; veins brown; first and second lines edged with brown, irregularly waved; median shade dark brown; orbicular and claviform confluent to form an 8-shaped spot, outlined with dark fuscous and evenly edged with shining white; a pale apical blotch, edged beneath by a curved brown line; a purplish-whitish terminal suffusion below middle. Hindwings fuscous.

Kent to Berks and Norfolk, occasional, a recent immigrant tending to establish itself; C. Europe, N. Asia; 7, 9. Larva on *Aconitum napellus;* 5, 8.

[*P. illustris*, F., has been regarded as British on the faith of ancient records, but there seems little doubt that these were erroneous.]

2. **P. chrysitis,** *L.* 33-37 mm. Head and collar orange. Forewings fuscous, purplish-tinged, paler terminally; antemedian and postmedian bands shining brassy, sometimes connected below middle; first, second, and subterminal lines darker brassy-fuscous; spots dark-outlined, claviform transverse-oval. Hindwings rather dark fuscous, darker posteriorly.

Britain to Sutherland, Ireland, common; N. and C. Europe, N. and WC. Asia; 6-8. Larva green; six white marks above on each segment; lateral line slender, white; subspiracular series of white dots; head green: on *Lamium*, *Urtica*, *Arctium*, etc.; 7, 9-4.

3. **P. orichalcea**, *F.* (*chryson*, Esp.) 41-45 mm. Head and collar orange. Forewings purplish-fuscous; first line dark fuscous; a large irregular shining brassy blotch above middle posteriorly, and a broad suffused deep golden-brown blotch connecting this with dorsum; second line traversing these, on former deep golden, on latter pale purplish towards dorsum. Hindwings fuscous, darker posteriorly.

England to Lancashire, local; C. Europe, N. and WC. Asia; 7, 8. Larva green; dorsal line darker, white-edged; lateral series of oblique white streaks; spiracles white: on *Eupatorium;* 6, 7.

4. **P. bractea**, *F.* 38-44 mm. Head and collar reddish-ochreous. Forewings purplish-fuscous, with darker strigulae; first, median, and second lines indistinctly darker; dorsal $\frac{3}{5}$ of median band ferruginous-brown, enclosing an oblique triangular shining pale brassy blotch in middle of disc; a ferruginous subterminal suffusion, deepest towards costa. Hindwings pale dull fuscous-yellowish; a rather dark fuscous terminal band.

Caermarthen and Worcester to Ross, Ireland, local; N. and C. Europe, N. Asia; 7, 8. Larva pale green; dorsal and spiracular lines white; head pale green, brown-marked: on *Eupatorium* and *Urtica;* 5, 6.

5. **P. festucae**, *L.* 31-36 mm. Head orange. Forewings ferruginous-brown, lighter and more ferruginous dorsally; a pale brassy spot at base of costa; lines darker, first posteriorly silvery-edged towards dorsum; a large trapezoidal spot in disc before middle, a smaller subtriangular spot beyond it, and an irregular suffused spot towards termen beneath apex shining white, brassy-tinged. Hindwings fuscous, lighter anteriorly.

Britain to Ross, Ireland, in marshy places, rather local; N. and C. Europe, N. Asia; 8. Larva green; dorsal line darker, white-edged; subdorsal and lateral white; spiracular yellow; head green: on grasses, *Carex*, and *Typha;* 5-7.

6. **P. iota**, *L.* 34-42 mm. Forewings light dull rosy, with some fuscous strigulae; a median basal and five costal spots brown; first and second lines brown-edged, nearly straight; dorsal $\frac{3}{5}$ of median band ferruginous-brown; a small V-shaped discal spot before middle, and small round spot immediately beyond it pale golden; reniform partly brownish-edged; subterminal line suffusedly margined with brown except towards tornus posteriorly. Hindwings light fuscous; a dark fuscous terminal band.

Britain to the Orkneys, Ireland, common; N. and C. Europe;

6, 7. Larva pale green; dorsal line darker, white-edged; subdorsal and lateral white; spiracular yellowish; dots whitish; head pale green: on *Lamium*, *Urtica*, *Senecio*, etc.; 8-5.

7. **P. pulchrina**, *Hw.* (*v-aureum*, Gn.) 32-40 mm. Forewings light fuscous-purplish; subbasal, first, and second lines more or less marked with pale yellowish, edged with dark brown; a brown fascia beyond subbasal; a dark ferruginous-brown submedian patch joining first and second, margined beneath posteriorly by an orange suffusion; a V-shaped discal mark before middle and small round spot close beyond it shining pale yellowish or white; median shade dark brown; reniform partly outlined with pale golden, with some dark brown suffusion; subterminal line suffusedly edged with brown except towards tornus posteriorly. Hindwings pale fuscous; a darker postmedian shade and terminal band.

Britain to the Orkneys, Ireland, common; C. Europe, NW. Asia; 6, 7. Larva undistinguished from that of *P. iota;* on *Lamium*, *Urtica*, *Lonicera*, etc.; 8-5.

8. **P. gamma**, *L.* 37-41 mm. Forewings whitish-fuscous, slightly purplish-tinged, with some indistinct darker strigulae; subbasal, first, and second lines partly marked with yellow-whitish, edged with brown; a shining pale yellowish or white y-shaped median discal mark, surrounded by brown suffusion; reniform partly outlined with shining yellow-whitish, with some dark brown suffusion; subterminal line edged with brownish suffusion except on tornus posteriorly. Hindwings pale fuscous; a dark fuscous terminal band.

Britain to the Shetlands, Ireland, very common, sometimes abundant; Europe, N. and WC. Asia, Africa; 5-9. Larva green; dorsal line double, whitish; subdorsal and lateral whitish; spiracular yellowish; dots whitish; head green: on *Urtica*, *Sonchus*, *Geranium*, *Lamium*, etc.; 6-4. Imago flies freely in sunshine; it has been observed migrating in prodigious numbers.

9. **P. chalcites**, *Esp.* (*bimaculata*, Stph.; *eriosoma*, Dbld.; *verticillata*, Gn.) 31-38 mm. Abdomen in ♂ with pale yellowish-ochreous lateral tufts of long hairs beyond middle, anal tuft black beneath. Forewings fuscous, more or less golden-suffused; lines partly golden-whitish, edged with ferruginous-brown, subbasal followed by a dark brown spot in disc; a golden-white oblique U-shaped mark and oval spot beyond it in disc, surrounded by a dark golden-brown suffusion; corner of reniform marked with golden-white; subterminal line

indistinct; an oblique dark brown apical suffusion. Hindwings pale fuscous, yellowish-tinged, posteriorly suffused with dark fuscous.

Kent, a rare immigrant only; S. Europe, S. Asia, Africa, Australia, New Zealand, Pacific Islands; 5-8. Larva on low plants, polyphagous; 6-4.

10. **P. ni**, *Hb.* 27-34 mm. Abdomen in ♂ with lateral yellowish hairtufts on 5th segment. Forewings light brown, mixed with purple-whitish and sprinkled with dark fuscous; lines pale, dark-edged, subbasal edged in disc posteriorly by an oblique black mark, subterminal preceded on upper half by some dark fuscous dashes; an oblique U-shaped spot in disc and small round usually confluent spot beyond it paler, edged with shining white, followed by a darker suffusion reaching second line; a fine double ochreous-whitish line before termen. Hindwings pale fuscous; a broad darker terminal band.

Dorset to Cornwall, a scarce immigrant only; S. Europe, C. Asia to Japan, N. America, Africa; 8, 9.

11. **P. interrogationis**, *L.* 32-37 mm. Forewings fuscous, suffusedly irrorated with whitish and sprinkled with black; subbasal, first, and second lines obscurely whitish, edged with dark fuscous; a shining whitish sometimes confluent V-shaped mark and small round spot beyond it in disc, surrounded by a dark fuscous suffusion; reniform partly outlined with shining whitish, with some dark fuscous suffusion; subterminal line edged anteriorly with dark fuscous, preceded by a brownish suffusion. Hindwings light fuscous; a dark fuscous terminal band.

Britain to Sutherland, Ireland, local, commoner northwards; N. and C. Europe, N. Asia; 6, 7. Larva green; dorsal line darker, pale-edged; subdorsal whitish-green; lateral whitish-green, darker-edged; spiracular yellow; head green: on *Erica, Calluna, Urtica,* etc.; 5, 6.

12. **P. tripartita**, *Hufn.* (*urticae*, Hb.) 29-35 mm. Forewings light purplish-fuscous, median band darker dorsally; a grey whitish-edged dorsal blotch before first line; first and second lines edged internally with black, externally with brownish, second followed dorsally by a whitish suffusion; spots outlined with raised black scales, orbicular and claviform confluent into a transverse blotch; subterminal line cloudy, whitish, more distinct at tornus, blackish-edged towards apex. Hindwings rather dark fuscous, mixed with fuscous-whitish anteriorly.

Britain to the Orkneys, Ireland, common; N. and C. Europe, N. and WC. Asia; 6-8. Larva pale green, whitish-mixed dorsally; dorsal series of darker oval marks; subdorsal series of oblique darker streaks; lateral line white, on 5-7 connected by white lines with dorsal area; 12 with two prominent points: on *Urtica*, *Epilobium*, etc.; 8, 9.

13. **P. triplasia**, *L.* 30-37 mm. Forewings rather dark ashy-fuscous; basal area suffused with brownish-ochreous; first and second lines pale, edged internally with black and externally with red-brown, second followed dorsally by a whitish-ochreous suffusion; spots obscurely pale-edged, partly outlined with black, claviform subquadrate; subterminal line obscurely pale, towards tornus whitish-ochreous, near costa preceded by two or three short black dashes. Hindwings pale fuscous; a broad dark fuscous terminal band.

Britain to the Clyde, Ireland, common; Europe, WC. Asia to N. Persia, N. Africa; 6-8. Larva olive-green or purplish-brown; dorsal line pale, interrupted by dark pale-edged blotches on 5, 6, 12; lateral series of pale oblique streaks; spiracular line ochreous-whitish; 12 with two prominent points; head pale greyish-ochreous, brown-freckled: on *Urtica*, *Humulus*, *Lamium*, etc.; 7-9.

13. CATEPHIA, *O.*

Head loosely scaled. Antennae in ♂ ciliated. Palpi rather long, recurved, second joint thickened with appressed scales, terminal long, cylindrical. Thorax with posterior crest. Abdomen with several crests. Tibiae rough-scaled. Hindwings: 5 approximated to 4.

A genus of moderate extent, principally Indo-Malayan and African.

1. **C. alchymista**, *Schiff.* 38-42 mm. Forewings ashy-blackish; subbasal line black, posteriorly brown-edged; first and second lines black, irregularly indented, externally partly brown-edged; spots and an additional round one below reniform brownish, black-outlined, claviform sometimes obsolete; subterminal line irregular, partly dilated, light brown, on costa white. Hindwings dark fuscous; a white blotch occupying anterior half except dorsum; terminal white marks at apex and above tornus.

I. of Wight, Sussex, Essex, scarce and local; C. and S. Europe; 5. Larva reddish-brown, irrorated with black and paler; pairs of black prominent dorsal tubercles on each segment; 5 and 12 with pairs of pointed prominences; head brown; anterior edge of 2 yellow: on oak; 7, 8.

14. Phoberia, *Hb.*

Head rough-scaled. Antennae in ♂ ciliated. Palpi moderately long, ascending, second joint thickened with appressed scales, terminal moderate, porrected, obtuse. Thorax with slight central ridge. Abdomen not crested. Middle and posterior tibiae spinose. Hindwings: 5 approximated to 4.

A genus of few species, but very widely distributed, especially within the tropics. Larva with prolegs on 7 shorter.

1. **P. lunaris**, *Schiff.* 51-56 mm. Forewings light greyish-ochreous to brown, sprinkled with dark fuscous; first and second lines pale yellowish, first anteriorly dark-edged, second sinuate, posteriorly edged with broad dark suffusion; reniform and dot-like orbicular dark fuscous; subterminal line brown, irregular; a terminal series of dark fuscous dots. Hindwings pale brownish; a broad rather dark fuscous terminal band.

SE. England to Hants and Norfolk, S. Ireland, a scarce immigrant only; C. and S. Europe, Asia Minor, N. Africa; 5, 6. Larva brown; dorsal line moniliform; subdorsal broad, dark, enclosing pale spots; three fine dark lines beneath this; spiracular sometimes pale yellow; two lateral projections on 5; pairs of dorsal points on 12 and 13; head brown: on oak; 7-8.

15. Catocala, *Schrk.*

Head loosely haired. Antennae in ♂ ciliated. Palpi moderate, ascending, second joint shortly rough-scaled, terminal short, obtuse. Thorax with slight posterior crest. Abdomen slightly crested towards base. Middle and sometimes posterior tibiae spinose. Hindwings: 5 closely approximated to 4.

A large genus, distributed throughout the northern hemisphere, but most plentiful in N. America. The imagos are remarkable for the bright colouring of the hindwings, that of the forewings being assimilated to the bark of trees. Larva with subspiracular series of fleshy filaments; it rests on the bark of trees, and is also protectively coloured.

1. Hindwings with a light blue fascia . 1. *fraxini.*
„ without blue fascia . . . 2.
2. Hindwings with median fascia right-angled above middle . 3. *sponsa.*
„ „ not right-angled above middle . . 3.

3. Median fascia sharply contracted above angle . 4.
„ „ not markedly contracted . 4. *promissa.*
4. Hindwings ochreous-rosy . . . 2. *nupta.*
„ crimson . . . 5. *electa.*

1. **C. fraxini**, *L.* 90-100 mm. Forewings yellow-grey-whitish, irrorated with brown; first and second lines dentate, edged with yellowish-brown; median and subterminal lines dentate, yellowish-brown; reniform edged with dark yellowish-brown; beneath it a pale diamond-shaped spot outlined with dark. Hindwings grey-blackish; a pale lilac-blue postmedian fascia.

Britain to Berwick, E. Ireland, always rare; C. Europe, N. Asia; 8, 9. Larva brownish-grey, black-speckled; pointed prominences on 9 and 12: on ash and poplar; 6, 7.

2. **C. nupta**, *L.* 70-78 mm. Forewings pale greyish-ochreous, irrorated with dark fuscous; first and second lines dentate, edged with dark fuscous; median and subterminal lines cloudy, dark fuscous; reniform centred and edged with dark fuscous; beneath it a subovate spot outlined with dark fuscous. Hindwings ochreous-rosy; an angulated median fascia contracted above angle, and terminal band black; cilia white.

Britain to Berwick, common; C. Europe, NW. and WC. Asia to N. India; 8, 9. Larva grey, irrorated with brown; a dark dorsal blotch on 9; prominences on 9 and 12: on *Salix*, poplar, and ash; 5-7.

3. **C. sponsa**, *L.* 58-64 mm. Forewings brown, whitish-sprinkled; first and second lines dentate, hardly pale, edged internally with blackish and externally with darker brown; reniform edged with whitish, enclosing a dark brown ring, and outlined with dark fuscous; space before it more whitish-mixed; beneath it a pale spot outlined with blackish; subterminal line cloudy, whitish, edged posteriorly with dark fuscous. Hindwings crimson; a twice angulated median fascia and terminal band black.

S. England to Gloucester and Suffolk, local; C. Europe, NW. Asia; 7, 8. Larva pale ochreous, darker-freckled; a light ochreous dorsal blotch on 5, and a mark on 10; darker brownish dorsal blotches between 9 and 10, and on 12; head reddish-brown, with black marginal band above: on oak; 5, 6.

4. **C. promissa**, *Esp.* 52-58 mm. Forewings light brown, irregularly mixed with whitish and pale ochreous, and sprinkled with dark fuscous; lines dentate, first strongly edged with dark

fuscous, second edged anteriorly with dark fuscous, posteriorly with brown, subterminal whitish, edged with dark fuscous; reniform edged with whitish, enclosing a dark fuscous ring, and outlined with dark fuscous; beneath it a light spot outlined with blackish. Hindwings crimson; a twice sinuate median fascia and terminal band black.

S. England to Gloucester and Norfolk, local; C. Europe, Asia Minor; 7, 8. Larva light greenish-grey, darker-freckled; pale dorsal ochreous-tinged blotches on 5, 9, and 10; a prominence on 9, and slight ridge on 12: on oak; 5, 6.

5. **C. electa**, *Bkh.* 60-70 mm. Forewings light brown, suffusedly irrorated with grey-whitish; lines hardly pale, very irregular, strongly dentate, subbasal, first, and second edged internally with blackish, externally with brown; reniform edged with whitish, enclosing a dark brown ring, and outlined with dark brown; beneath it a spot partly outlined with blackish; subterminal line obscure. Hindwings crimson; an angulated median fascia contracted above angle, and terminal band black; cilia white.

Sussex, Dorset, two specimens, a doubtful resident; C. Europe, Asia Minor, N. Asia; 8, 9. Larva on *Salix;* 6, 7.

16. EUCLIDIA, *O.*

Head rough-scaled. Antennae in ♂ ciliated. Palpi moderate, ascending, second joint rough-scaled, terminal moderate, obtuse. Thorax without crest. Abdomen not crested. All tibiae spinose. Hindwings: 5 approximated to 4.

Includes only a few species from northern temperate regions. Imago flying freely in the sunshine. Larva slender, without prolegs on 7 and 8.

Second line very strongly contorted . . . 1. *mi.*
„ „ not contorted . . . 2. *glyphica.*

1. **E. mi**, *Cl.* 25-31 mm. Forewings ochreous-brown, irregularly mixed with ochreous-whitish and dark fuscous; lines ochreous-whitish, first straight, very oblique, second angulated above middle, near dorsum abruptly contorted inwards to middle of disc, on dorsum connected with first, subterminal partly double; orbicular small, blackish; reniform dark-suffused anteriorly, edged posteriorly with ochreous-whitish. Hindwings blackish; two or three anterior spots, a twice angulated postmedian fascia, and subterminal series of spots pale ochreous-yellowish.

Britain to Aberdeen, Ireland, common; Europe, N. and WC. Asia; 5, 6. Larva pale ochreous or yellow; dorsal and lateral lines double, light reddish-brown or fuscous; subdorsal and supraspiracular lines darker brown; spiracular pale, edged with dark brown; head pale pinkish-ochreous: on *Trifolium*, *Medicago*, and *Melilotus;* 7-9.

2. **E. glyphica**, *L.* 26-31 mm. Forewings brown, darker and slightly purplish-tinged anteriorly; two darker rather irregular fasciae forming median band; beyond second a dark brown costal spot; subterminal line obscurely pale, sometimes broadly suffused. Hindwings dark fuscous; postmedian and subterminal orange-yellow fasciae, broader and partly confluent towards costa, becoming obsolete dorsally.

Britain to the Clyde, Ireland, common; Europe, N. and WC. Asia; 5, 6. Larva ochreous-yellowish, sides sometimes ferruginous-tinged; dorsal line double, brown; subdorsal double, dark grey; spiracular yellow, edged with dark grey; head brown, yellow-marked: on *Trifolium* and *Medicago;* 7-9.

17. ERASTRIA, *O.*

Head loosely scaled. Antennae in ♂ ciliated. Palpi moderate, ascending, second joint rough-scaled, terminal moderate, obtuse. Thorax smooth-scaled, with very slight posterior crest. Abdomen with several crests. Tibiae with appressed scales. Hindwings: 5 approximated to 4.

A rather limited genus, confined to the northern hemisphere, commoner within the tropics. Larva with prolegs on 7 absent, on 8 rudimentary. Pupa in a cocoon coated with earth.

1. **E. fasciana**, *L.* (*fuscula*, Bkh.) 23-30 mm. Forewings brown, sprinkled with dark fuscous and partly with whitish; first and median lines dark fuscous; spots whitish-edged, space between orbicular and reniform suffused with dark fuscous; second line whitish, anteriorly edged with dark fuscous, on dorsal half merged posteriorly in a broad white suffusion, subterminal white. Hindwings fuscous.

England to York, S. Ireland, local; C. Europe, WC. Asia to N. Persia; 6, 7. Larva pale yellowish; dorsal line reddish or greenish; subdorsal brown; lateral reddish or greenish; spiracular reddish; head pale yellowish, reddish-sprinkled: on *Molinia caerulea;* 8, 9.

18. EUSTROTIA, *Hb.*

Characters of *Erastria*, but abdomen not crested.

A genus of considerable extent and very general distribution, but absent from New Zealand, and most plentiful within the tropics. Larva with prolegs on 7 and 8 shorter, rudimentary, or absent. Pupa in a cocoon.

1. Hindwings sharply marked with blackish and whitish . . . . . 2.
,, not so marked . . . . . 3.
2. Forewings with tips of apical cilia white . 3. *luctuosa.*
,, ,, ,, ,, fuscous 2. *lucida.*
3. Forewings with two straight white fasciae 4. *argentula.*
,, without such fasciae . . . 4.
4. Forewings with two crimson fasciae . 6. *viridaria.*
,, without crimson fasciae . . 5.
5. Forewings with disc dark brown . . 5. *uncula.*
,, ,, not dark brown . 1. *venustula.*

1. **E. venustula,** *Hb.* 18-20 mm. Forewings brownish-ochreous, rosy-tinged, suffused with white towards base of dorsum; first and second lines white, first obsolete towards costa; spots partly outlined with white, orbicular and reniform only on lower ends, between these a blackish spot; subterminal line suffusedly white, more or less interrupted in middle, where there are two or three blackish marks. Hindwings brassy-grey-whitish.

Essex (Epping Forest), local; C. Europe, WC. Asia to N. Persia; 6, 7. Larva purplish-brown; dorsal line pale, indistinct; a pale lateral spot on 5; head brown: on flowers of *Potentilla reptans*; 8.

2. **E. lucida,** *Hufn.* (*solaris*, Esp.; *albicollis*, F.) 25-27 mm. Forewings dark brown, partially tinged with yellowish and purplish; basal area ochreous-white, more or less spotted with grey; a large subquadrate ochreous-white spot on costa beyond middle; second line indicated by a series of blackish marks rising from this spot; subterminal whitish on dorsal half; cilia on lower half of termen white. Hindwings varying from yellow-whitish with dark fuscous costal spot and terminal fascia, to dark fuscous with a median row of two or three yellow-whitish spots.

Once recorded, locality unknown, probably a rare immigrant; C. and S. Europe, WC. Asia to Turkestan, N. Africa; 5, 8. Larva without prolegs on 7 and 8; brown-grey, reddish-tinged, dorsally mixed with blackish and whitish; spiracular line white: on *Convolvulus* and *Malva*; 6, 7, 9.

3. **E. luctuosa**, *Esp.* 22-26 mm. Forewings brown mixed with dark fuscous; first and second lines blackish; an ochreous-white postmedian costal blotch, reaching half across wing; subterminal line partly ochreous-whitish; outer half of cilia white, with a brown median spot. Hindwings dark fuscous; a broad yellow-whitish median band.

S. England to Gloucester and Norfolk, local; C. and S. Europe, WC. Asia to Turkestan, N. Africa; 5, 6, 8. Larva with prolegs on 7 and 8 shorter; ochreous-grey, sometimes reddish-tinged, darker laterally; dorsal and subdorsal lines pale, interruptedly dark-edged; lateral dark-edged; spiracular dark brown, pale-edged beneath; subspiracular reddish-brown; head pale ochreous-grey, with rows of dark dots: on *Convolvulus arvensis*; 6, 7, 9.

4. **E. argentula**, *Hb.* (*bankiana*, F.) 21-25 mm. Forewings yellowish-brown, somewhat sprinkled with dark fuscous; a spot at base of costa, two narrow straight outwardly oblique black-edged fasciae, second running to tornus, a costal mark before apex, and a straight subterminal streak shining white; reniform represented by a dilation of second fascia. Hindwings yellow-whitish sprinkled with dark grey, more densely terminally.

Norfolk, Cambridge, S. Ireland, in fens, very local; C. Europe, N. and WC. Asia; 6. Larva slender, with prolegs on 7 absent, on 8 rudimentary; yellow-green; dorsal line dark green, indistinct; subdorsal yellow; head pale green: on *Poa aquatica*, *P. annua*, etc.; 7.

5. **E. uncula**, *Cl.* (*uncana*, L.) 22-25 mm. Forewings brown, becoming dark brown in disc; broad flesh-coloured streaks along costa and dorsum; orbicular and reniform flesh-coloured, white-edged, confluent above with costal streak; three or four pale lines before termen, first straight, white. Hindwings light fuscous.

Britain to Kirkcudbright, S. Ireland, local; N. and C. Europe, N. Asia; 6. Larva slender, with prolegs on 7 absent, on 8 rudimentary; green; dorsal line darker; subdorsal whitish; spiracular pale yellow; head yellowish-green: on *Carex sylvatica*; 7, 8.

6. **E. viridaria**, *Cl.* (*aenea*, Hb.) 17-18 mm. Forewings brown, tinged with olive-greenish; base of costa, a suffused postmedian and broader terminal fascia dull crimson; between

the fasciae a pale line. Hindwings dark fuscous mixed with ochreous-grey; median and terminal fasciae sometimes crimson-tinged.

Britain to Ross, Ireland, common; Europe, Asia Minor, N. Asia; 5-7. Larva with prolegs on 7 absent, on 8 rudimentary; green; dorsal line darker, pale-edged; subdorsal, lateral, supra-spiracular, and subspiracular lines pale, last whitish on 10-13; head green, faintly brown-freckled: on *Polygala;* 7-9.

19. PANEMERIA, *Hb.*

Head rough-haired. Antennae in ♂ filiform, simple. Palpi short, porrected, rough-scaled. Thorax rough-haired. Abdomen not crested. Tibiae rough-scaled. Hindwings: 5 approximated to 4.

It is doubtful whether any other species can be correctly referred to this genus, which is correlated with the preceding. Imago flies freely in sunshine. Larva with all prolegs developed. Pupa subterranean.

1. **P. tenebrata**, *Sc.* (*arbuti*, F.) 18-19 mm. Forewings brown, more or less mixed with dark fuscous and sprinkled with grey-whitish; first and second lines indistinctly darker; median shade dentate, cloudy, dark fuscous; a dark brown shade indicating subterminal line. Hindwings blackish; an irregular deep yellow postmedian fascia, becoming obsolete dorsally.

England to Cumberland, S. Ireland, common; N., C., and SE. Europe; 5, 6. Larva light green; dorsal line dark green; subdorsal whitish, dark-edged; spiracular yellow-whitish, edged above with dark green; head light green: on seed-capsules and flowers of *Cerastium;* 6, 7.

20. EMMELIA, *Hb.*

Head with appressed scales, face forming large rounded prominence, lower edge truncate beneath. Antennae in ♂ ciliated. Palpi moderate, subascending, with appressed scales, terminal joint short, rather pointed. Thorax with slight posterior crest. Abdomen not crested. Tibiae smooth-scaled. Hindwings: 5 approximated to 4.

Includes a single species only, probably correlated with *Eustrotia.* Larva without prolegs on 7 and 8.

1. **E. trabealis**, *Sc.* (*sulphuralis*, L.) 19-23 mm. Forewings pale ochreous-yellow; a longitudinal streak from base of costa beneath middle and another along dorsum, terminating in an irregular partly double transverse streak representing second line, about

five spots on costal half above these, and a subterminal series of about four spots dark fuscous or black. Hindwings fuscous, darker terminally.

Suffolk, Norfolk, Cambridge, very local; C. and S. Europe, WC. Asia to Turkestan; 6, 8. Larva reddish-brown; dorsal line darker, pale-edged; subdorsal faintly darker; spiracular broad, pale yellow, enclosing a fine brown line: on *Convolvulus arvensis;* 7, 9.

21. Eublemma, *Hb.*

Head with appressed scales. Antennae in ♂ ciliated. Palpi moderate, ascending, second joint thickened with dense tolerably appressed scales, terminal short, obtuse. Thorax smooth-scaled. Abdomen not crested. Tibiae with loosely appressed hairs. Forewings: 7 separate, 9 and 10 out of 8. Hindwings: 5 approximated to 4.

A genus of considerable extent and universal distribution in sufficiently warm regions. The British species belong to a group whose larvae probably all feed on *Compositae;* but some others have the singular habit of feeding on the injurious species of *Coccus* (scale-insects), and are thus beneficial.

1. Second line present, whitish . . . 2.
   ,, obsolete . . . 1. *ostrina.*
2. Second line strongly curved above . 2. *parva.*
   ,, straight above . . 3. *paula.*

1. **E. ostrina,** *Hb.* 17-22 mm. Forewings whitish-ochreous mixed with greyish-ochreous, and partially suffused with pale brownish; a dark fuscous median dash from base; median shade cloudy, brown; space between this and subterminal line purplish-tinged; subterminal whitish-ochreous, edged anteriorly with dark brown suffusion, tending to form dashes. Hindwings whitish-fuscous, darker terminally.

Kent to Devon, Glamorgan, scarce and local; France, S. Europe, WC. Asia to N. Persia, N. Africa; 6, 7, 9. Larva in shoots of *Carduus;* 8, 10 (?).

2. **E. parva,** *Hb.* 12-16 mm. Head and thorax yellow-whitish. Forewings pale ochreous, reddish-tinged; median shade straight, deep ochreous, posteriorly sharply white-edged; a minute black dot representing reniform; second line indistinctly whitish, darker-edged anteriorly, strongly curved on upper half; subterminal line indicated by darker anterior suffusion towards costa and dorsum, and two or three minute posterior black dots. Hindwings ochreous-whitish, posteriorly suffused with fuscous.

I. of Wight to Devon and Somerset, I. of Man, scarce and local; S. Europe, WC. Asia to N. Persia; 6, 7.

3. **E. paula**, *Hb.* 14-18 mm. Head and thorax white. Forewings ochreous-white, suffused with light grey except towards base and along costa; median shade straight, ochreous-grey; second line straight, whitish, with a small angular median projection, posteriorly edged with ochreous-grey suffusion; subterminal obscurely whitish, followed by a darker grey costal spot. Hindwings fuscous-whitish, becoming fuscous posteriorly.

I. of Wight, rare and local; C. Europe; 7, 8. Larva amongst spun shoots of *Gnaphalium;* 6.

22. Rivula, *Gn.*

Head with tolerably appressed scales, with slight frontal tuft. Antennae in ♂ ciliated. Palpi moderately long, porrected, second joint with dense projecting scales beneath rather tufted anteriorly, terminal short. Thorax smooth-scaled. Abdomen not crested. Tibiae smooth-scaled. Forewings: 7 and 8 out of 9, 10 separate. Hindwings: 5 somewhat approximated to 4.

Besides the following, two N. American species have been referred to this genus, which must not be regarded as a very early form of the family, none such occurring in Britain. Larva with all prolegs developed. Pupa placed against the top of an incurved grass-blade, behind a few threads of silk.

1. **R. sericealis**, *Sc.* 21-23 mm. Head whitish. Forewings ochreous-yellowish, towards costa posteriorly and along termen sprinkled or suffused with brownish; first and second lines fuscous-tinged, very faint; reniform fuscous, containing two black dots. Hindwings fuscous-whitish, yellowish-tinged, becoming fuscous posteriorly.

Britain to I. of Arran, Ireland, common; Europe, Syria, N. Asia; 6, 7. Larva green; dorsal line darker; subdorsal white, inner edge waved; head pale greenish-ochreous: on *Brachypodium sylvaticum;* 8-5.

4. OCNERIADAE.

Head rough-haired. Ocelli present. Eyes glabrous. Tongue short, usually rudimentary. Antennae in ♂ bipectinated to apex. Labial palpi moderate, porrected, with dense rough hairs or scales. Thorax hairy above and beneath. Femora and tibiae densely hairy. Forewings: 7 and 8 out of 9. Hindwings:

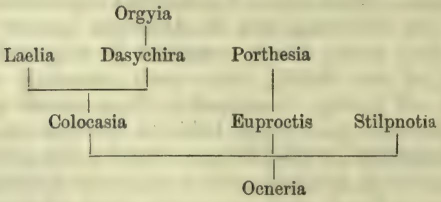
3, 4, 5 approximated at base, 6 and 7 stalked or approximated, 8 connected with cell before middle.

This family has its main development in the Indo-Malayan, African, and Australian regions, where the genera and species are numerous; elsewhere it is but poorly represented, and is absent from New Zealand. It originates from the *Psychidae*, and is in fact very closely connected with that family. The markings of the forewings are often obsolete; the reniform spot is represented by a curved discal mark.

Ovum spheroidal, smooth. Larva more or less hairy, often with characteristic dense compact dorsal tufts on some segments; the hairs are sometimes poisonous, causing irritation or painful inflammation, hence the larvae are usually uneatable. Pupa sometimes rather hairy, in a cocoon above ground.

Besides the following, *Laria l-nigrum*, Müll. (*v-nigrum*, F.), has been included in the British lists, but probably through an error of locality, the record being very ancient.

Phylogeny of Ocneriadae.



Tabulation of Genera.

1. Vein 4 of hindwings absent . . 5. Porthesia.
,, ,, present . . . 2.
2. Posterior tibiae without middle-spurs . . 3.
,, ,, with middle-spurs . . 5.
3. Forewings with 10 connected by bar with 9 . 4.
,, ,, not connected with 9 7. Stilpnotia.
4. Wings of ♀ rudimentary or absent . 2. Orgyia.
,, ,, developed . . . 3. Dasychira.
5. Abdomen with dorsal crests . . 4. Colocasia.
,, not crested . . . . 6.
6. Forewings with 10 connected by bar with 9 1. Laelia.
,, ,, not connected with 9 . . 7.
7. Hindwings with 6 and 7 stalked . . 6. Euproctis.
,, ,, ,, approximated . 8. Ocneria.

1. LAELIA, *Stph.*

Terminal joint of palpi exposed. Abdomen not crested. Anterior tarsi more or less hairy; posterior tibiae with middle-spurs. Forewings: 10 connected with 9. Hindwings: 6 and 7 stalked.

An Indo-Malayan genus of some extent, of which one species reaches Europe. Larva with two long projecting hair pencils on 2, one on 12, and dense erect tufts on 5-8.

1. **L. coenosa**, *Hb.* 38-44 mm. ♂. Forewings whitish-ochreous, brownish-tinged, especially towards costa; a very indistinct fuscous discal dot; a posterior series of several fuscous dots between veins. Hindwings whitish, towards apex brownish-tinged.

♀. Forewings and hindwings whitish.

Cambridge to Cheshire, in marshes, always local, now apparently very scarce or even extinct; C. Europe; 6-8. Larva blackish, hairs yellowish; pencils on 2 and 12 brownish or blackish, tufts on 5-8 yellowish: on reed (*Phragmites*) and *Cladium*; 7-9.

2. ORGYIA, *O.*

Palpi with terminal joint concealed. Abdomen with small subbasal crest. Anterior tarsi rough-haired; posterior tibiae without middle-spurs. Forewings: 10 connected with 9. Hindwings: 6 and 7 stalked. Wings in ♀ rudimentary or absent.

A genus of some extent and rather general distribution, but mainly inhabiting the Northern hemisphere. Imago flying freely in sunshine. Larva with two long projecting hair-pencils on 2, one on 12, and dense erect tufts on 5-8.

♂ with white subapical spots; ♀ wingless . 1. *gonostigma.*
♂ without white subapical spots; ♀ with rudimentary wings . . . . 2. *antiqua.*

1 **O. gonostigma**, *L.* 31-33 mm. Forewings deep brown, basal area partly whitish-sprinkled; first line fine, obscurely whitish, irregular; median dark fuscous, curved; second dark fuscous, upper half strongly outwards-curved and serrate; a trapezoidal dark fuscous discal spot, obscurely whitish-marked; a subterminal series of unequal white spots, widely interrupted below middle, preceded by large subcostal and small subdorsal orange spots. Hindwings blackish-fuscous. ♀ wholly apterous, antennae serrate.

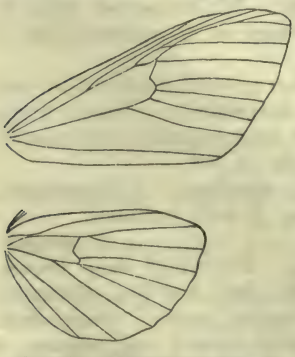
Hants to Cornwall, Essex to Norfolk, Leicester to Stafford, York, local; N. and C. Europe, WC. and N. Asia; 6, 7. Larva grey; subdorsal and spiracular lines orange-red; dorsal anteriorly and posteriorly sometimes white; hairs whitish, pencils on 2 and 12 black, tufts on 5-8 brownish: on oak, *Salix*, etc.; 9-5.

2. **O. antiqua**, *L.* 25-35 mm. Forewings ochreous-brown, posteriorly darker orange-brown; lines dark fuscous, first indistinct, median irregular, second strongly curved outwards on upper half; an obscure orange darker-edged discal spot; a conspicuous clear white spot above tornus. Hindwings deep brownish-orange. ♀ with rudimentary wings, antennae pectinated.

Britain to Sutherland, N. Ireland, common, mainly in gardens; Europe, Asia Minor, N. Africa, N. America; 8-10. Larva grey; dorsal line more or less black, red-spotted, sometimes partly whitish-edged; a subdorsal series of red spots; sometimes a blackish lateral line; hairs whitish, pencils on 2 and 12 black, branched at tips, tufts on 5-8 yellowish; a lateral black pencil on 6: on rose, hawthorn, hazel, etc.; 5-8.

3. Dasychira, *Hb.*

Palpi with terminal joint concealed. Thorax with posterior crest. Abdomen densely hairy, with one or two dorsal crests. Anterior tarsi rough-haired; posterior tibiae without middle-spurs. Forewings: 10 connected with 9. Hindwings: 6 and 7 stalked.



Neuration of *Dasychira pudibunda*.

Fairly numerous in species, mainly Indo-Malayan, but ranging into Europe, Africa, and Australia. Larva with dense erect tufts on 5-8 and sometimes 9, and long hair-pencil on 12.

Lines of forewings mixed with deep orange 1. *fascelina*.
Lines of forewings not mixed with orange 2. *pudibunda*.

1. **D. fascelina**, *L.* 37-50 mm. Forewings grey, sprinkled with black and whitish; middle of base mixed with deep orange; lines blackish mixed with deep orange, first curved or sinuate, second slightly sinuate, praesubterminal very irregular, indistinct; an indistinct blackish discal

mark in a whitish suffusion. Hindwings grey; an indistinct darker discal spot and sometimes a subterminal line.

Britain to Sutherland, rather local; N. and C. Europe, NW. and WC. Asia; 6. Larva dark grey; hairs long, whitish or yellowish, on head dark grey; tufts on 5-9 blackish, surrounded with pale grey hairs; pencil on 12 black; head black: on *Erica, Lotus, Salix*, etc.; 9-5.

2. **D. pudibunda**, *L.* 42-58 mm. Forewings white, more or less densely sprinkled with dark fuscous; an indistinct dark fuscous subbasal line; first and second lines dark fuscous, subsinuate, sometimes indistinctly double; discal spot obscurely outlined with dark fuscous, sometimes connected with costa by a dark suffusion; praesubterminal line partially fuscous, indistinct. Hindwings whitish, in ♂ fuscous-tinged; an indistinct grey discal spot, and sometimes a subterminal cloudy line.

England to York, common; N. and C. Europe; 5, 6. Larva pale green or brown; hairs long, whitish, yellow, pale green, or brownish; tufts on 5-8 yellow, pink, pale green, brown, or black, separated by black spaces; pencil on 12 rosy, brown, or black; head concolorous with body: on oak, hazel, *Humulus*, etc.; 8, 9.

4. COLOCASIA, *O.*

Abdomen hairy, in ♂ with two subbasal crests, posterior larger. Posterior tibiae with all spurs. Forewings: 10 out of 9, sometimes also connected by bar with 9. Hindwings: 6 and 7 stalked.

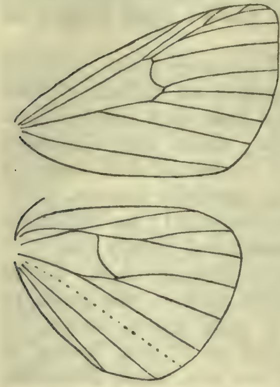
Besides the following, only two North American species are referred here. Larva with two long projecting hair-pencils on 2, one on 12, and dense erect tufts on 5 and 6.

1. **C. coryli**, *L.* 30-35 mm. Forewings brown, densely irrorated or suffused with white or ochreous-whitish; median band reddish-brown, sprinkled with whitish; first and second and sometimes median lines blackish, first twice angulate-dentate, second irregularly curved outwards on upper half; orbicular outlined with black; claviform black or outlined with black, touching both lines; discal spot transverse, anterior edge black, posterior brown; praesubterminal line darker, irregularly waved. Hindwings fuscous, anteriorly paler; a crescentic discal mark.

Britain to Sutherland, Ireland, rather common; N. and C. Europe; 5, 6. Larva greyish-ochreous or rosy-ochreous, hairs pale grey; dorsal line sometimes black; spiracular sometimes pale; tufts on 5 and 6 brown or reddish; pencils on 2 and 12 black or brown; head sometimes black: on beech, hazel, etc.; 7-9.

5. PORTHESIA, *Stph.*

Terminal joint of palpi exposed. Abdomen not crested. Anterior tarsi more or less hairy; posterior tibiae with middle-spurs. Forewings: 10 out of 9 above 7. Hindwings: 4 absent, 6 and 7 stalked.



Neuration of *Porthesia similis.*

A rather small group of Indo-Malayan origin, but ranging into Europe, Africa, and Australia; it is very closely related to *Euproctis.* Larva with well-developed dorsal prominences.

1. **P. similis**, *Fuesl.* (*auriflua*, F.) 32-44 mm. Anal tuft orange. Forewings white; a small dark grey or brownish tornal spot, sometimes nearly obsolete. Hindwings white.

Britain to the Clyde, common; C. and SW. Europe, WC. and N. Asia; 7, 8. Larva black; dorsal line double, red; black white-marked prominences on 5, 6, and 12; red tubercles on 10 and 11; a subdorsal series of white marks; lateral line red: on hawthorn, rose, poplar, etc.; 9-6.

6. EUPROCTIS, *Hb.*

Characters of *Porthesia*, but 4 of hindwings present.

A considerable genus, largely represented in the Indo-Malayan region, less freely in Africa and Australia, in Europe by one species only. Larva without specially developed tufts.

1. **E. chrysorrhoea**, *L.* 32-38 mm. Anal tuft brown or orange-brown. Forewings white; sometimes a small black tornal spot. Hindwings white.

England, local; C. and S. Europe, Asia Minor, N. Africa; 7, 8. Larva blackish, hairs ochreous; dorsal line double, pale ochreous, reddish-marked; subdorsal broad, white, interrupted; pale red dorsal tubercles on 10 and 11: on hawthorn, blackthorn, elm, etc.; 9-6.

7. STILPNOTIA, *Westw.*

Palpi with terminal joint concealed. Thorax with posterior crest. Abdomen densely hairy, hardly crested. Posterior tibiae without middle-spurs. Forewings: 10 free, sometimes out of 9 near base. Hindwings: 6 and 7 stalked.

At present restricted to one species. Larva without specially developed tufts.

1. **S. salicis**, *L.* 42-54 mm. Tibiae and tarsi black with white rings. Forewings and hindwings rather thinly scaled, white.

Britain to Ross, common; N. and C. Europe, WC. and N. Asia; 7, 8. Larva grey irrorated with dark grey; dorsal area black, with a row of whitish blotches or interrupted streak; subdorsal line whitish; subdorsal, spiracular, and sometimes dorsal rows of red spots; head blackish: on poplar and *Salix*; 9-6.

8. OCNERIA, *Hb.*

Palpi with terminal joint concealed. Abdomen not crested. Posterior tibiae with middle-spurs. Forewings: 10 out of 9 below 7. Hindwings: 6 and 7 approximated.

A rather considerable Indo-Malayan group, extending into Europe, Africa, and Australia. Larva without specially developed tufts.

Thorax black-marked . . . . 1. *monacha.*
„ not black-marked . . . 2. *dispar.*

1. **O. monacha**, *L.* 36-52 mm. Abdomen suffused with rosy. Forewings white, sometimes ochreous-tinged; an irregular black mark from base of costa, followed by a transverse series of black dots; first, median, second, and praesubterminal lines irregularly dentate, black, dilated on costa; orbicular dot black; discal spot crescentic-oblong, black-edged, absorbed in median line. Hindwings grey, whitish-mixed, darker terminally.

England to York, common; N. and C. Europe; 8. Larva whitish, marked with brown and blackish; dorsal streak brown, interrupted on 4, 8, and 9; two black spots on 3, and smaller ones on 5-12; sometimes red dorsal marks on 9 and 10: on oak, apple, fir, etc.; 5-7. This larva is sometimes excessively destructive to fir-forests on the Continent, stripping the trees so completely as to kill them.

2. **O. dispar**, *L.* 39-60 mm. Forewings in ♂ pale brownish sprinkled with dark fuscous, in ♀ whitish; an interrupted dark fuscous mark from base of costa; lines darker fuscous; first and second waved, stronger and darker on costa; median thick, cloudy; subterminal waved, in ♀ nearly obsolete; a

blackish-fuscous orbicular dot, and curved discal mark. Hindwings in ♂ ochreous-brownish, terminally suffused with fuscous, in ♀ whitish, with faint fuscous subterminal line; a fuscous discal mark.

Recorded from SE. and EC. England to Lancashire, but probably no longer resident in a wild state; C. and S. Europe, C. Asia, N. Africa; 8. Larva grey or ochreous, densely irrorated with blackish; two dorsal spots on 2-6 deep blue, on 7-12 red; a lateral row of reddish spots: on apple, hawthorn, poplar, etc.; 5-7. Also sometimes very injurious on the Continent.

2. NOTODONTINA.

Maxillary palpi obsolete. Forewings: 1b usually furcate but with lower fork often weak or tending to be obsolete, 1c absent, 5 rising not nearer to 4 than to 6, parallel, 7 and 8 out of 9 (rarely one of these absent through coincidence, 7 in *Cataclysme* apparently but not truly separate, 9 in *Polyplocidae* sometimes apparently out of 10). Hindwings almost always with frenulum, 1c absent.

The group is very extensive, there being several exotic families in addition to the nine occurring in Britain.

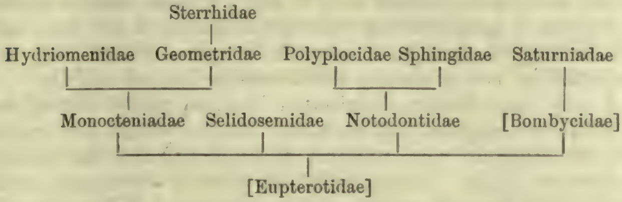
Imago with forewings more or less broad-triangular; hindwings broad-ovate.

Type of markings: Forewings with four transverse lines, viz. first, median, second, and subterminal, and a discal mark or spot, placed on transverse vein. Hindwings with similar markings, but first line usually absent. In the *Hydriomenidae* this type undergoes some modification, which makes it convenient to use a different phraseology, explained under the head of that family.

Pupa with segments 9-11 free; not protruded from cocoon in emergence.

The phylogeny is sufficiently indicated in the accompanying diagram, into which it has been necessary to introduce two exotic families (in brackets), to explain the connection. In reference to these, it should be understood that the *Bombycidae* are not the family sometimes called by that name in Britain (the *Lasiocampidae*, which will be found in the next group), but that of which the familiar silk-worm moth (*Bombyx mori*) forms the type. It must also be noted that although the *Polyplocidae* and *Sphingidae* are conveniently stated to be derived from the *Notodontidae*, they in fact originate from a non-existent form slightly anterior to that family and having vein 5 of the hindwings fully developed.

PHYLOGENY OF NOTODONTINA.


Sterrhidae
Hydriomenidae
Geometridae
Polyplocidae
Sphingidae
Saturniadae
Monocteniadae
Selidosemidae
Notodontidae
[Bombycidae]
[Eupterotidae]

TABULATION OF FAMILIES.

1. Hindwings with 7 from upper margin of cell . 2.
„ „ 7 from angle of cell . . 3.
2. Hindwings with 8 approximated to 7 beyond cell 6. POLYPLOCIDAE.
„ „ 8 remote from 7 . 9. SATURNIADAE.
3. Hindwings with 5 imperfect or obsolete . . 4.
„ „ 5 fully developed . . 5.
4. Hindwings with 8 connected with cell towards middle 8. NOTODONTIDAE.
„ „ 8 free or obsoletely connected near base only 5. SELIDOSEMIDAE.
5. Antennae thickened towards middle or posteriorly 7. SPHINGIDAE.
„ not thickened . . . . 6.
6. Hindwings with 5 rising much nearer 6 than 4 3. GEOMETRIDAE.
„ „ 5 from about or below middle of transverse vein . . 7.
7. Hindwings with 8 very shortly anastomosing with cell near base, thence rapidly diverging . 2. STERRHIDAE.
„ „ 8 approximated to or anastomosing with cell to middle or beyond . 8.
8. Hindwings with 8 free or shortly anastomosing with cell near base only 4. MONOCTENIADAE
„ „ 8 anastomosing with cell to beyond middle or connected by bar beyond middle 1. HYDRIOMENIDAE.

1. HYDRIOMENIDAE.

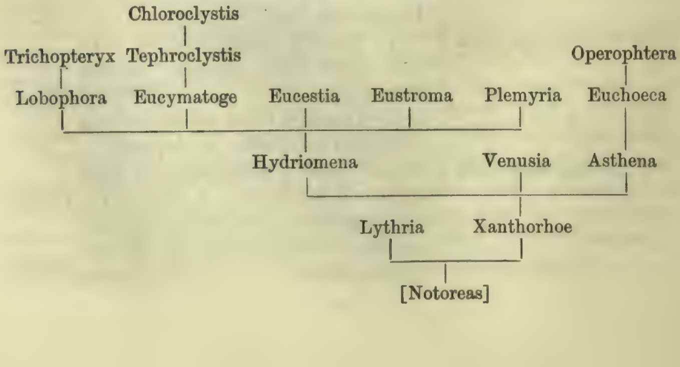
Tongue developed. Forewings: 10 rising separate, anastomosing with 11 and 9 (forming double areole), or rising out of 11 and anastomosing with 9 (forming simple areole). Hindwings: 5 fully developed, parallel to 4, 6 and 7 almost always stalked or connate, 8 anastomosing with upper margin of cell from near base to beyond middle, or sometimes approximated only and connected by bar or shortly anastomosing beyond middle.

A very large family, distributed in equal plenty throughout all temperate regions, but becoming scarcer within the tropics. The structure is very uniform throughout, and the generic distinctions slight. Imago with body slender, forewings usually broad. The type of markings of the forewings is here more or less obscured by the development of a number of usually waved transverse striae, alternately dark and light, which again tend by coalescence to form six similar dark fasciae, of these the first often forms a basal patch, the second precedes the first line (which is nearer the base than usual), the third and fourth form the median band, limited by the median and second lines, and the fifth and sixth border the pale subterminal line. The markings of the hindwings are sometimes nearly as in the forewings, but more often partially obsolete; those species which have the hindwings distinctly marked always expose them in repose.

Ovum broad-oval, rather flattened, with usually angular reticulations. Larva elongate, slender, with few hairs, without prolegs on 7-9; often imitating live or dead twigs and shoots. Pupa usually subterranean.

The relations of all the principal genera are indicated in the diagram, in which is included (in brackets) the exotic genus *Notoreas*, to furnish a common starting-point.

PHYLOGENY OF HYDRIOMENIDAE.



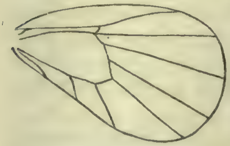
Tabulation of Genera.

1. Posterior wall of areole absent . 15. CATACLYSME.
,, wall of areole present . . . 2.
2. Posterior tibiae without middle-spurs . . 3.
,, ,, with all spurs present . . 4.
3. Hindwings in ♂ with dorsal lobe 1. TRICHOPTERYX.
,, ,, without lobe . 5. GYMNOSCELIS.
4. Areole simple . . . . . 5.
,, double . . . . . 13.
5. Forewings with 11 running into 12 4. CHLOROCLYSTIS.
,, with 11 free from 12 . . . 6.
6. Hindwings in ♂ with dorsal lobe 2. MYSTICOPTERA.
,, ,, without lobe . . . 7.
7. Antennae in ♂ pectinated . . . 8.
,, ,, simple . . . . 10.
8. Thorax hairy beneath; palpi long-haired . 24. LYTHRIA.
,, glabrous; palpi rough-scaled . . 9.
9. Face forming an obtuse prominence 23. RHODOMETRA.
,, not prominent . . . 21. VENUSIA.
10. Antennae in ♂ ciliated with long fascicles 18. OPEROPHTERA.
,, ,, shortly and evenly ciliated . 11.
11. Face flat, smooth . . . 19. EUCHOECA
,, rounded, with somewhat projecting scales . 12.
12. Abdomen with small segmental crests 6. TEPHROCLYSTIS.
,, not crested . . . 14. PLEMYRIA.
13. Antennae in ♂ pectinated . 22. XANTHORHOE.
,, ,, not pectinated . . . 14.
14. Hindwings in ♂ with dorsal lobe . 3. LOBOPHORA.
,, ,, without lobe . . . 15.
15. Thorax with horny anterior prominence . 17. PELURGA.
,, without horny prominence . . 16.
16. Hindwings in ♂ with basal dorsal ridge and pocket 17.
,, ,, without basal ridge and pocket 18.
17. Anterior tibiae hooked . . . 9. EUCESTIA.
,, ,, not hooked . . 10. CARSIA.
18. Hindwings in ♂ with subcostal hair-pencil 8. COLLIX.
,, ,, without subcostal hair-pencil . 19.
19. Hindwings in ♂ with deep dorsal furrow 11. CALOCALPE.
,, ,, without dorsal furrow . . 20.
20. Forewings in ♂ with hair-pencil along 1b beneath
13. EUSTROMA.
,, ,, without hair-pencil on 1b . 21.

21. Abdomen in ♂ with claspers very large, exserted 12. PHILEREME.
,, ,, with claspers normal . . 22.
22. Face flat, smooth . . . 20. ASTHENA.
,, rounded, with somewhat projecting scales . 23.
23. Abdomen with small segmental crests throughout 7. EUCYMATOGE.
,, not crested, or near base only 16. HYDRIOMENA.

1. TRICHOPTERYX, *Hb*.

Face smooth. Antennae in ♂ shortly ciliated. Palpi rough-scaled. Abdomen sometimes crested. Tibial middle-spurs absent. Forewings: areole double. Hindwings in ♂ with dorsal folded lobe, veins distorted; 2 seldom absent, 6 and 7 sometimes separate, 8 in ♂ connected by bar with cell near apex or rarely with 7 or as in ♀, in ♀ anastomosing with cell to beyond middle or rarely as in ♂.



Hindwing of *Trichopteryx carpinata* ♂.

A small genus, derived from *Lobophora*, characteristic of Northern temperate regions. The altered structure of vein 8 in the hindwings of the ♂, and the separation of 6 and 7 (very rare in this family), are due to lateral expansion, intended to compensate for absorption of the dorsal area by the folded lobe; when they occur in the ♀ also, they afford an instance of the transference of secondary sexual characters through inheritance.

1. Forewings dull green . . . 1. *viretata*.
,, not green . . . . 2.
2. Third and fourth fasciae ochreous-brown 3. *polycommata*.
,, ,, ,, not ochreous-brown 2. *carpinata*.

1. **T. viretata**, *Hb*. 23-26 mm. Palpi long. Forewings dull olive-green, with curved darker striae; median band and fifth fascia marked with black, striae beyond these with whitish; a black discal mark. Hindwings grey; a darker discal dot.

England, Ayr, Ireland, not common; C. Europe; 5, 6, 8. Larva pale greenish, sometimes partly suffused with pink; a dorsal pink or purplish-crimson line or series of spots; subdorsal line pink, sometimes interrupted; lateral sometimes faintly pink; head brown, often crimson-marked; 13 with two short points: on holly, *Hedera*, sycamore, etc.; 6, 7, 9.

2. **T. carpinata**, *Bkh*. (*lobulata*, Hb.) 28-31 mm. Palpi

short. Forewings grey-whitish, sprinkled with blackish-grey, with faint waved striae; fasciae partially marked with blackish-grey, third and fourth sometimes suffused with dark grey; a blackish discal mark. Hindwings whitish, with several faint grey lines; a grey discal dot.

Britain to Caledonian Canal, common; N. and C. Europe, N. Asia, Japan; 4, 5. Larva dull green; dorsal and subdorsal lines darker, indistinct; spiracular bright yellow; 13 with two points: on *Lonicera*, *Salix*, etc.; 6-8.

3. **T. polycommata**, *Hb.* 30-33 mm. Palpi rather short. Forewings pale greyish-ochreous, striated with fuscous; first, third, and fourth fasciae ochreous-brown, marked with black on veins, fourth sharply angulated near costa, median space fuscous in disc; subterminal line distinct, margins brown. Hindwings pale ochreous-grey; a grey discal dot and faint posterior line.

England (except EC.), Arran, local; C. Europe, NW. Asia; 4. Larva yellowish-green; dorsal line darker; spiracular yellowish-white; incisions yellowish; 13 with two points: on ash, *Ligustrum*, *Salix*, etc.; 6.

2. MYSTICOPTERA, *Meyr.*

Face with short cone of scales. Antennae in ♂ minutely ciliated. Palpi rough-scaled. Abdomen crested. Forewings: areole simple. Hindwings in ♂ with dorsal doubly folded lobe; 2 in ♂ absent, 8 in ♂ connected with cell by bar beyond middle, in ♀ anastomosing to beyond middle.

Only the single species is known.

1. **M. sexalisata**, *Hb.* 20-23 mm. Forewings whitish-fuscous or whitish, striated with ochreous; all fasciae fuscous, first basal, third and fourth confluent, angularly curved, darker towards costa; subterminal line distinct, waved; a black discal dot. Hindwings grey; a darker discal dot.

England, local; N. and C. Europe; 6. Larva wrinkled, green; dorsal and subdorsal lines whitish, indistinct; 13 with two pink-tipped points: on *Salix*; 8, 9.

3. LOBOPHORA, *Curt.*

Face with short cone of scales. Antennae in ♂ ciliated. Palpi rough-scaled. Abdomen crested. Forewings: areole double. Hindwings in ♂ with dorsal folded lobe, veins distorted; 6 and 7 sometimes separate, 8 anastomosing with cell to beyond middle.

A genus of few species, inhabiting Europe and North America; derived from the *Hydriomena* group.

1. **L. halterata**, *Hufn.* (*hexapterata*, Schiff.) 26-28 mm. Forewings whitish, much sprinkled with blackish-grey; basal patch and broad second fascia dark grey; third and fourth remote, marked with dark grey; fifth and sixth partly suffused with dark grey; a blackish discal dot. Hindwings whitish; termen sprinkled with dark grey.

Britain to Sutherland, S. Ireland, local (unfrequent in Scotland); N. and C. Europe; 5, 6. Larva pale yellowish-green; subdorsal line pale yellow; 13 with two rosy-white points: on aspen and *Salix;* 6, 7.

4. CHLOROCLYSTIS, *Hb.*

Face with short cone of scales. Antennae in ♂ shortly ciliated. Palpi rough-scaled. Abdomen crested. Forewings: areole simple, 11 running into or anastomosing with 12. Hindwings: 8 anastomosing with cell to beyond middle.

This genus contains few European species, but attains some development in S. Asia and New Zealand, and has stragglers elsewhere. The tendency to a green coloration is characteristic always.

1. Hindwings coloured as forewings . . 2.
,, differently coloured . . 1. *coronata.*
2. Wings whitish-green; a blackish abdominal band 3. *debiliata.*
,, green; abdominal ring incomplete or broken . . 2. *rectangulata.*

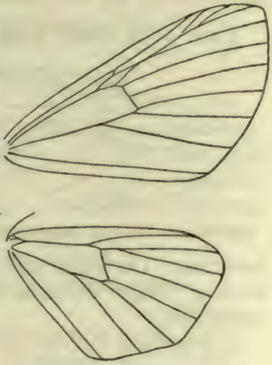
1. **C. coronata**, *Hb.* 16-20 mm. Abdomen with black basal and subbasal rings. Forewings dull green, with darker striae; second fascia blackish on dorsum; edges of median band partially blackish, anterior angulated, posterior blacker on upper half and twice angulated, upper angle more prominent. Hindwings pale grey, with several darker lines.

England to York, Ireland, rather common; C. Europe; 5-7. Larva flesh-colour or yellowish-green; dorsal and subdorsal lines reddish-brown; sometimes a dorsal series of brown triangular marks: on flowers of *Clematis*, *Eupatorium*, *Achillea*, etc.; 7, 8.

2. **C. rectangulata**, *L.* 17-21 mm. Abdomen with blackish lateral subbasal spots or incomplete ring. Forewings green, with blackish-grey striae; edges of median band black, anterior

curved, posterior twice angulated, lower angle more prominent; a black discal mark. Hindwings as forewings.

Britain to Ross, Ireland, common; N. and C. Europe; 6, 7. Larva rather stout, pale yellowish-green; dorsal line sometimes darker green or dull red; spiracular darker; incisions reddish: on flowers of apple and pear; 4, 5. Sometimes injurious in orchards.



Neuration of *Chloroclystis rectangulata.*

3. **C. debiliata**, *Hb.* 17-21 mm. Abdomen with broad blackish subbasal ring. Forewings very pale green or green-whitish, with fuscous-grey striae, darker on costa; edges of median band blackish-dotted, anterior curved, posterior twice obtusely angulated; a blackish discal dot. Hindwings as forewings.

Hants, Devon, Stafford, Lancashire, Aberdeen, W. and S. Ireland, local; C. Europe; 6. Larva rather stout, dull, yellowish-green; dorsal line darker; spiracular dull yellow; head brown or blackish: on *Vaccinium;* 4, 5.

5. Gymnoscelis, *Mab.*

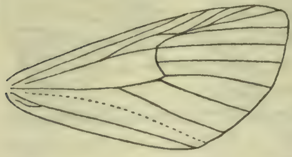
Face with short cone of scales. Antennae in ♂ ciliated. Palpi rough-scaled. Abdomen crested. Tibial middle-spurs absent. Forewings: areole simple, 11 sometimes anastomosing with or running into 12. Hindwings: 8 anastomosing with cell to beyond middle.

There is only one European species, but several others are known from the Canary Isles, Indo-Malayan region, and Polynesia.

1. **G. pumilata**, *Hb.* 14-20 mm. Forewings rather elongate, pale brownish-ochreous, somewhat mixed with whitish, with fuscous striae; fasciae mixed or suffused with dull reddish, partly black-sprinkled; anterior edge of median band angulated near costa, posterior black-marked, obtusely angulated in middle. Hindwings as forewings.

Britain to the Orkneys, Ireland, common; W. and S. Europe to Turkestan; 4, 5, 7, 8. Larva reddish-ochreous-grey or reddish-brown; dorsal line blackish-grey, marked with a series of triangular yellow-edged spots; lateral yellow, edged with dark grey; spiracular yellow: on flowers of *Ulex*, *Cytisus*, *Erica*, etc.; 6, 9.

6. TEPHROCLYSTIS, *Hb.*



Forewing of *Tephroclystis oblongata.*

Face with short cone of scales. Antennae in ♂ ciliated. Palpi rough-scaled. Abdomen crested throughout, sometimes slightly. Forewings: areole simple. Hindwings: 8 anastomosing with cell to beyond middle.

A large genus, principally characteristic of the European region, less numerous in S. Asia and North America. The large number and great similarity of the species renders their determination difficult without considerable experience.

1. Posterior half of thorax white . . . 2.
,, ,, ,, not white . . 3.
2. Thorax anteriorly fuscous . 16. *succenturiata.*
,, wholly white . . . 11. *oblongata.*
3. Thorax with white central stripe . . 34. *insigniata.*
,, without white central stripe . . 4.
4. Abdomen with entire black subbasal ring . 5.
,, without entire black ring . . 7.
5. Forewings in disc white . . . 33. *irriguata.*
,, ,, not white . . . 6.
6. Median line black throughout . . 1. *venosata.*
,, ,, not black throughout . 2. *expallidata.*
7. Forewings with dark grey band and two reddish-ochreous fasciae . . . 8.
,, not so marked . . . . 9.
8. Median band interrupted with ochreous 14. *pulchellata.*
,, ,, not interrupted with ochreous 15. *linariata.*
9. Forewings without discal dot . . . 10.
,, with dark discal dot . . . 11.
10. Abdomen towards base suffused with pale reddish 22. *isogrammaria.*
,, not reddish towards base 23. *pygmaeata.*
11. Forewings more or less distinctly elongate . 12.
,, not elongate . . . . 27.
12. Cilia of hindwings conspicuously barred . . 13.
,, ,, not conspicuously barred . 15.

13. Forewings light ochreous-brown . . 40. *extensaria.*
,, grey . . . . . 14.
14. Discal mark preceded by a white spot . 39. *nanata.*
,, ,, not preceded by a white spot 38. *helveticaria.*
15. Abdomen with brown or ferruginous subbasal band 16.
,, without such band . . . 19.
16. Subterminal line whitish throughout . . 17.
,, ,, not whitish . . . 18.
17. Forewings with small black costal spots 7. *pimpinellata.*
,, without black costal spots . 29. *pusillata.*
18. Discal spot large, transverse . . 26. *indigata.*
,, ,, dot-like . . . 28. *subciliata.*
19. Abdomen in ♂ with black lateral streak . . 20.
,, ,, without black lateral streak . 24.
20. Fifth and sixth fasciae twice markedly interrupted
32. *exiguata*
,, ,, ,, not markedly interrupted . 21.
21. Forewings with discal mark whitish-edged . 22.
,, ,, ,, ,, not whitish-edged . 23.
22. Forewings greyish-ochreous . . 30. *abbreviata.*
,, brownish-ochreous, in disc whitish-mixed
31. *dodoneata.*
23. Forewings with subterminal line distinct, white
36 *innotata.*
,, ,, ,, obscure . 35. *fraxinata.*
24. Forewings brownish . . . . 25.
,, grey . . . . . 26.
25. Forewings whitish-mixed . . . 10. *vulgata.*
,, not whitish-mixed . . 4. *minutata.*
26. Forewings whitish-mixed . . . 18. *lariciata.*
,, not whitish-mixed . 27. *constrictata.*
27. Abdomen with black lateral streak . . 28.
,, without black lateral streak . . 29.
28. Forewings at least partly reddish-tinged . 12. *subfulvata.*
,, not reddish-tinged . 9. *albipunctata.*
29. Forewings with distinct white tornal spot . 30.
,, without distinct white tornal spot . 35.
30. Abdomen with interrupted black subbasal ring . 31.
,, without such ring . . . 32.
31. Forewings with discal mark whitish-edged 6. *assimilata.*
,, ,, ,, ,, not whitish-edged
5. *absinthiata.*
32. Abdomen with lateral series of black spots 19. *virgaureata.*

Abdomen without black spots . . . 33.
33. Discal spot of forewings transverse . . 34.
,, ,, ,, dot-like . . 13. *satyrata.*
34. Discal mark posteriorly whitish-edged . 37. *sobrinata.*
,, ,, not whitish-edged . . 8. *valerianata.*
35. Discal mark transverse . . . . 36.
,, ,, dot-like . . . . 37.
36. Forewings brown . . 3. *campanulata.*
,, fuscous . . . 25. *trisignaria.*
37. Discal dot of forewings grey, indistinct 21. *plumbeolata.*
,, ,, black, distinct . . 38.
38. Fifth and sixth fasciae brownish-ochreous 20. *cauchyata.*
,, ,, ,, not brownish-ochreous . 39.
39. Forewings with veins and costa ochreous-brown 24. *tenuiata.*
,, ,, ,, not ochreous-brown 17. *castigata.*

1. **T. venosata**, *F.* 22-25 mm. Abdomen with black subbasal ring. Forewings greyish-ochreous or grey; median band limited by pairs of pale blackish-edged waved striae; veins on dorsal half, a line near base, and a median line traversing a black linear discal mark blackish. Hindwings paler than forewings; a dark grey discal dot; median line and posterior striae as in forewings, but indistinct.

Britain to the Shetlands, E. and W. Ireland, common; Europe, Asia Minor, Syria; 5, 6. Larva rather stout, blackish-grey, with some white dots; head dark brown: on flowers and seeds of *Lychnis* and *Silene;* 7, 8.

2. **T. expallidata**, *Gn.* 25-26 mm. Abdomen with black subbasal ring and lateral streak. Forewings light brown; edges of median band black-dotted, forming blackish spots on costa, posterior angulated near costa; faint subbasal and median angulated lines, on costa blackish; subterminal obscure, whitish, anteriorly sometimes edged with reddish-fuscous; a strong black discal mark. Hindwings ochreous-grey, with faint darker striae; a dark grey discal dot.

S. and W. England to Lancashire, Aberdeen, E. and W. Ireland, local; Belgium, Germany; 7, 8. Larva pale yellow or green; dorsal line dark brown, with a series of irregular brown marks; subdorsal dark brown, interrupted; a lateral series of oblique brown streaks; markings sometimes obsolete, or almost wholly suffused with deep reddish-brown: on flowers of *Solidago virgaurea;* 9.

3. **T. campanulata**, *HS.* 21-22 mm. Abdomen with black lateral subbasal spots. Forewings brown, with obscure darker striae; posterior edge of median band blackish-dotted, curved or bent above middle; subterminal line hardly paler; a black discal mark. Hindwings light grey, striated with darker; a dark grey discal dot.

Kent and I. of Wight to Hereford, local; Belgium, Germany; 6, 7. Larva rather stout, light ochreous-brown; dorsal line dark brown or black, marked with a series of dark brown or black lozenges; subdorsal and spiracular darker brown or blackish; head brown or black: on seeds of *Campanula trachelium;* 8, 9.

4. **T. minutata**, *Gn.* 19-21 mm. Differs from *T. absinthiata* as follows: forewings more elongate, not reddish-tinged, striae more distinct, more sharply angulated, discal dot less elongate; hindwings paler and more ochreous-tinged.

Britain to the Orkneys, Ireland, common; Holland, Germany; 6, 7. Larva rather stout, purplish-pink, pale ochreous, greenish, whitish, or blackish, white-dotted; a dorsal series of dark V-shaped marks on 5-9; dorsal and spiracular lines pale; head pale brown, darker-marked: on flowers of *Erica*, *Calluna*, *Scabiosa;* 8-10. It is very questionable whether this is anything more than a heath-frequenting form of *T. absinthiata.*

5. **T. absinthiata**, *Cl.* 22-24 mm. Abdomen with interrupted black subbasal ring. Forewings brown, reddish-tinged, with faint obtusely angulated striae, blackish on costa, edges of median band forming costal spots; subterminal line whitish, interrupted, forming a tornal spot; a black discal mark. Hindwings grey, with faint darker striae; a dark grey discal dot; a whitish tornal dot.

Britain to Ross, Ireland, common; N. and C. Europe; 6, 7. Larva rather stout, green, whitish, or ochreous, white-dotted; a dorsal series of dark V-shaped marks, most distinct on 5-9, pale-edged; spiracular line pale: on flowers of *Artemisia*, *Achillea*, *Senecio*, etc.; 8-10.

6. **T. assimilata**, *Gn.* 18-21 mm. Differs from *T. absinthiata* as follows: forewings with striae more distinct, discal mark stronger, posteriorly whitish-edged, veins on fourth fascia shortly black-marked, in both wings tornal white spot more conspicuous, cilia distinctly barred.

Britain to Caledonian Canal, common; France, Holland; 5, 6, 8. Larva slender, yellowish-green, white-dotted; dorsal line darker or reddish-purple; subdorsal darker, indistinct; sometimes a dorsal series of six reddish-purple V-shaped marks; head green: on currant (*Ribes*) and *Humulus*; 7, 9, 10.

7. **T. pimpinellata**, *Hb.* (*denotata*, Gn.) 21-23 mm. Abdomen with ferruginous subbasal band. Forewings rather elongate, light brown, somewhat whitish-mixed, with obscure darker angulated striae, forming several small blackish costal spots; posterior edge of median band black-marked; subterminal line whitish; veins partly black-marked; a strong black discal mark. Hindwings light grey, with darker grey striae and discal dot.

England to York, E. Ireland; C. Europe, NW. Asia; 4, 5, 8. Larva green or pink; dorsal and subdorsal lines darker or purple; spiracular yellowish or whitish; head yellowish: on flowers of *Pimpinella, Achillea, Senecio*; 6, 9, 10.

8. **T. valerianata**, *Hb.* 18-20 mm. Abdomen without markings. Forewings grey, with indistinct darker striae; posterior edge of median band obtusely angulated; terminal area suffusedly darker, subterminal line obscurely whitish, forming a small white tornal spot; a fine blackish discal mark. Hindwings light grey, with faint striae, terminal area suffusedly darker; a whitish tornal dot.

England, local; C. Europe; 6. Larva tapering anteriorly, bright green; dorsal and subdorsal lines darker; spiracular pale green; incisions yellowish: on flowers and seeds of *Valeriana officinalis*; 7, 8.

9. **T. albipunctata**, *Hw.* (*tripunctaria*, HS.) 20-21 mm. Thorax with white posterior spot. Abdomen with black lateral line. Forewings grey, with darker angulated striae, strongest on costa; subterminal line whitish, forming a small tornal and sometimes a submedian spot; veins beyond middle marked with short blackish dashes and pale dots; an oval black discal dot. Hindwings whitish-grey, striated with grey, veins dark, interrupted; a dark grey discal and white tornal dot.

England to York, Aberdeen, S. Ireland, local; Holland, Germany; 5, 6. Larva tapering anteriorly, pale yellow or yellowish-green, white-dotted; dorsal line brown, marked with a series of brown spots; subdorsal brown, indistinct; a lateral series of brown spots; markings sometimes obsolete; head small, dark brown, ochreous-marked: on flowers and seeds of *Angelica* and *Heracleum*; 9.

10. **T. vulgata**, *Hw.* 19-21 mm. Abdomen with subbasal blackish spots. Forewings rather elongate, brown, slightly reddish, mixed with whitish, with distinct angulated darker

fuscous striae; veins partly marked with blackish and white; posterior edge of median band blackish-marked; subterminal line whitish, forming a larger white tornal crescent; a small black discal mark, partly whitish-edged; cilia obscurely barred. Hindwings grey, whitish-mixed, with darker striae; a darker discal and whitish tornal dot.

Britain to the Hebrides, Ireland, very common; C. Europe; 5, 6. Larva tapering anteriorly, ochreous or reddish-brown, white-dotted; a dorsal series of brown marks; spiracular line yellowish, sometimes black-marked; incisions orange: on hawthorn, *Rubus*, *Senecio*, etc.; 7.

11. **T. oblongata**, *Thnb.* (*centaureata*, F.) 19-22 mm. Thorax white. Abdomen with black lateral spots on two basal segments. Forewings white; striae obsolete, on margins dark grey; edges of median band very fine, blackish, curved near costa; subterminal line edged by pale brownish shades; a black discal crescent. Hindwings whitish; striae dorsally, edges of subterminal line and a discal dot grey.

Britain to Caledonian Canal, W. Ireland, common; Europe, W. Asia; 5, 6, 8. Larva slender, green or ochreous; dorsal line and a series of five tridentate marks dull red, orange, darker green, or absent: on flowers and seeds of many *Umbelliferae*, *Compositae*, etc; 7, 9.

12. **T. subfulvata**, *Hw.* 21-23 mm. Abdomen with black lateral streak. Forewings brown, reddish-tinged; costa and termen (sometimes also dorsum) rather broadly grey, striated with dark grey; a black discal dot. Hindwings grey, with darker striae and discal dot.

Britain to Caledonian Canal, common; C. Europe, NW. Asia; 7. Larva slender, pale yellowish-brown, grey-brown, or reddish-brown, white-dotted; dorsal line and a series of oval blotches olive-brown; subdorsal dark brown, interrupted; spiracular white: on *Achillea millefolium*; 9, 10.

13. **T. satyrata**, *Hb.* (*Curzoni*, Gregs.) 21-23 mm. Abdomen mixed with white. Forewings fuscous or grey, somewhat whitish-mixed, with darker obtusely angulated striae; veins marked alternately with blackish and white; a clear white tornal dot; a dark fuscous discal dot. Hindwings as forewings, but less distinctly marked.

Britain to Orkneys, Ireland, common (less frequent southwards); N. and C. Europe; 5, 6. Larva dull green, sometimes yellow-speckled; dorsal line and sometimes a series of spearhead-shaped marks darker, reddish-brown, or purplish; spiracular sometimes pale: on flowers of *Compositae*, *Scabiosa*, *Gentiana*, etc.; 8, 9.

14. **T. pulchellata**, *Stph.* 20-22 mm. Abdomen with subbasal black-marked brownish band. Forewings pale brownish-ochreous, with grey curved striae; edge of basal patch blackish; second and fifth fasciae reddish-ochreous-brown; median band dark grey, interrupted in middle with ochreous, edges black-marked, whitish-edged, posterior obtusely angulated; subterminal line whitish, edges partly black-marked; a black discal mark. Hindwings whitish-grey, with dark grey discal dot and striae, praesubterminal ochreous.

Britain to Sutherland, Ireland, common; W. Europe; 5, 6. Larva green or pale greenish-ochreous; dorsal, subdorsal, and spiracular lines darker or purplish; head brownish: on flowers of *Digitalis purpurea;* 7, 8.

15. **T. linariata**, *F.* 17-20 mm. Differs from *T. pulchellata* as follows: forewings with striae less waved, less distinct, median band not interrupted with ochreous, posterior edge less or not angulated; hindwings with striae and subterminal line less distinct.

Britain to Aberdeen, E. Ireland, common (unfrequent in Scotland); C. and SW. Europe; 6, 7. Larva green; sometimes a dorsal series of reddish-brown marks; subdorsal line sometimes yellowish: on flowers of *Linaria vulgaris;* 8, 9.

16. **T. succenturiata**, *L.* 21-22 mm. Thorax white, anterior edge dark fuscous. Abdomen with base white. Forewings grey; first five fasciae separated by pairs of angulated whitish striae; sixth brown, with grey veins; a large black discal dot; base of dorsum, and often disc posteriorly suffused with white. Hindwings whitish-grey, with grey striae; a blackish-grey discal dot; termen brownish.

Britain to Perth, rather common; N. and C. Europe, W. Asia; 7. Larva reddish-brown or olive-brown; dorsal line and a series of spearhead-shaped blotches darker brown or blackish; subdorsal fuscous; spiracular whitish: on *Artemisia* and *Achillea;* 8, 9.

17. **T. castigata**, *Hb.* (*jasioneata*, Crewe) 18-21 mm. Antennal cilia of ♂ $\frac{3}{4}$. Abdomen with lateral series of small black spots. Forewings whitish-grey, sometimes ochreous-tinged, with obtusely angulated dark grey striae; a black discal dot. Hindwings as forewings, sometimes more whitish, striae curved, less marked, discal dot blackish-grey.

Britain to the Hebrides, Ireland, common; C. Europe, NW.

Asia; 5, 6. Larva slender, pale ochreous or reddish-ochreous; dorsal line and a series of spearhead-shaped blotches brown or dull green; subdorsal sometimes reddish; head ochreous or dull green: on *Scabiosa*, *Lychnis*, *Ononis*, *Epilobium*, etc.; 8, 9.

18. **T. lariciata**, *Frr.* 21-23 mm. Differs from *T. castigata* as follows: antennal cilia of ♂ 1, forewings more elongate, ground more whitish, not ochreous-tinged, striae darker, more angulated, veins much marked with black, discal black spot larger, oblong.

Britain to the Hebrides, N. and W. Ireland, common; C. Europe, WC. and N. Asia; 5, 6. Larva slender, green or reddish-ochreous; dorsal line darker or brownish, anal end reddish; subdorsal sometimes brownish; spiracular pale yellowish or whitish: on larch and fir; 7, 8.

19. **T. virgaureata**, *Dbld.* (*pimpinellata*, Gn.) 19-21 mm. Differs from *T. castigata* as follows: forewings distinctly ochreous-tinged, striae less distinct except on costa, veins posteriorly alternately marked with blackish and whitish, a distinct white tornal dot, discal black spot larger, oval.

England to York, Ireland, local; WC. Europe; 5, 6. Larva slender, ochreous-yellowish; dorsal line and a series of five spearhead-shaped whitish-edged blotches darker: on flowers of *Solidago*, *Senecio*, etc.; 8, 9.

[*T. ultimaria*, B., a small South European tamarisk-feeding species, has been included in English lists, but without apparent justification.]

20. **T. cauchyata**, *Dup.* (*pernotata*, Gn.) 22-23 mm. Abdomen without markings. Forewings light greyish-ochreous, with curved brownish-ochreous striae; veins whitish, marked with groups of scanty black scales; fifth and sixth fasciae brownish-ochreous, subterminal line whitish; a small black discal dot. Hindwings as forewings, but markings less distinct.

Once, but locality unrecorded; C. Europe; 6 (?). Larva on flowers of *Solidago virgaurea*; 8, 9.

21. **T. plumbeolata**, *Hw.* 16-18 mm. Abdomen without markings. Forewings pale grey, sometimes ochreous-tinged, with curved dark grey striae; an indistinct dark grey discal dot. Hindwings as forewings, but markings much more indistinct.

Britain to Aberdeen, Ireland, common; C. Europe; 5, 6. Larva rather stout, pale yellowish-green; dorsal line purple-reddish, dilated in middle of each segment; subdorsal purple-reddish, sometimes suffused into dorsal: on *Melampyrum pratense;* 7, 8.

22. **T. isogrammaria**, *HS.* (*haworthiata*, Stt.) 14-16 mm. Abdomen towards base suffused with pale reddish. Forewings pale grey, somewhat whitish-mixed, with curved grey striae, fasciae darker. Hindwings as forewings, but markings more indistinct.

England to Lancashire, Ireland, common; C. Europe; 6, 7. Larva rather stout, pink or bluish-green; dorsal and subdorsal lines darker, sometimes obsolete: on flowers of *Clematis vitalba;* 7, 8.

23. **T. pygmaeata**, *Hb.* 14-16 mm. Abdomen without markings. Forewings fuscous, sometimes whitish-mixed, with faint curved darker striae; subterminal line formed by whitish dots, sometimes obsolete except a larger tornal white dot; cilia obscurely whitish-barred. Hindwings as forewings, but markings almost obsolete.

Suffolk, Norfolk, Cambridge, N. England to Caledonian Canal, Ireland, local; N. Europe, Netherlands; 5, 6. Larva very slender, pale yellowish-green; dorsal line and a series of urn-shaped blotches pale olive; subdorsal and spiracular pale olive: on flowers and seeds of *Stellaria holostea;* 6, 7.

24. **T. tenuiata**, *Hb.* 15-17 mm. Abdomen with margins mixed with black and white. Forewings light greyish-ochreous, with curved rather dark fuscous striae; veins and costa ochreous-brown; edges of median band forming dark costal spots; a black discal dot. Hindwings whitish-grey, with dark grey striae and discal dot.

Britain to Ross, Ireland, local; C. Europe; 6, 7. Larva rather stout, dull yellowish-green; sides and middle of back rosy-tinged; a dorsal series of indistinct fuscous spots, forming a blackish line posteriorly, edged by an interrupted blackish line; a lateral series of oblique flesh-coloured marks; head black: in catkins of *Salix caprea;* 3, 4.

25. **T. trisignaria**, *HS.* 20-23 mm. Abdomen with small indistinct blackish lateral subbasal spot. Forewings fuscous, with indistinct obtusely angulated darker striae; edges of median band darker-marked, stronger on costa; a transverse blackish discal spot. Hindwings fuscous, with faint striae; a dark fuscous linear discal mark.

England to York, local; C. Europe; 6, 7. Larva rather stout, pale green; dorsal and subdorsal lines dark green; spiracular yellow-whitish; head black: on *Angelica* and *Heracleum;* 9.

26. **T. indigata,** *Hb.* 15-19 mm. Abdomen with subbasal brown band and lateral blackish spot. Forewings rather strongly elongate, grey, with faint darker angulated striae; edges of median band obscurely blackish-marked, more strongly on costa; a strong transverse blackish discal spot. Hindwings pale grey, with faint grey striae; a dark grey discal mark.

Britain to Caledonian Canal, local; C. Europe; 5, 6, 8. Larva slender, pale greenish-yellow or yellow-reddish; dorsal line dull reddish-brown or fuscous, sometimes obsolete; subdorsal and spiracular pale yellow; head reddish: on *Pinus sylvestris* and *P. abies;* 7, 9.

27. **T. constrictata,** *Gn.* 16-19 mm. Abdomen with margins mixed with blackish. Forewings rather elongate, grey, with indistinct curved darker striae; edges of median band fine, dark fuscous, blackish-marked, forming blackish costal spots; a blackish discal mark. Hindwings light grey, with obscure darker striae; a dark grey discal mark.

Dorset, N. England, Scotland to Ross, Ireland, local; not recorded elsewhere; 7, 8. Larva slender, with numerous very short bristles, dark green; dorsal line broad, purplish-red; spiracular greenish-yellow: on flowers of *Thymus;* 8, 9.

28. **T. subciliata,** *Gn.* 15-16 mm. Antennal cilia of ♂ 2, fasciculated. Abdomen with rather dark reddish-fuscous subbasal ring. Forewings rather elongate, pale greyish-ochreous, middle of disc and sixth fascia mixed with brownish-ochreous; first five fasciae formed by pairs of dark fuscous angulated striae; a blackish irregular discal, and whitish tornal dot. Hindwings pale greyish-ochreous, more whitish costally, with confused fuscous striae; a grey discal dot.

England, local; Germany; 7, 8. Larva rather stout, yellowish-green; dorsal line dark green or purplish; subdorsal and lateral yellow-whitish; spiracular pale green: on flowers of maple; 5.

29. **T. pusillata,** *F.* 17-20 mm. Abdomen with a brown subbasal band, and margins mixed with black. Forewings rather elongate, very pale greyish-ochreous, with indistinct curved fuscous striae; edges of basal patch and median band dark fuscous, stronger on costa; subterminal line whitish, forming median and tornal dots, margins suffused with fuscous; an oval blackish discal spot. Hindwings whitish; edges of median band, praesubterminal line, and discal dot rather dark grey.

Kent to Devon, local; N. and C. Europe; 5. Larva slender, orange-reddish or ochreous-green; dorsal line fuscous, often nearly obsolete; subdorsal fuscous; spiracular yellow: on *Pinus abies;* 6, 7.

30. **T. abbreviata**, *Stph.* 21-23 mm. Abdomen in ♂ with black lateral streak. Forewings rather elongate, greyish-ochreous, with bent rather dark fuscous striae; veins partially marked with black, especially towards posterior edge of median band; all fasciae somewhat suffused with fuscous; a linear black discal mark, partially whitish-edged. Hindwings grey, with darker striae and faint discal dot; a darker dorsal subbasal spot.

England, Ireland, common; WC. Europe; 4, 5. Larva slender, pale ochreous-brown; dorsal line brown, double, with a series of reddish-brown V-shaped marks; spiracular formed of pale waved lines: on oak; 6, 7.

31. **T. dodoneata**, *Gn.* 17-19 mm. Abdomen in ♂ with black lateral streak. Forewings rather elongate, brownish-ochreous, mixed in disc with whitish, with bent rather dark fuscous striae; veins partially black-marked, especially towards edges of median band; a transverse black discal mark, partially whitish-edged. Hindwings whitish-grey, with dark grey striae and discal dot.

England to York, N. Ireland, local; WC. Europe; 4, 5. Larva ochreous-reddish, orange-reddish, or pale yellow-green, white-dotted; dorsal line fuscous, red-brown, or blackish, sometimes with a series of arrowhead-shaped blotches; subdorsal brownish; lateral line or series of oblique marks yellowish; spiracular greenish-yellow, sometimes fuscous-marked: on oak and hawthorn; 6-8.

32. **T. exiguata**, *Hb.* 19-22 mm. Abdomen in ♂ with black lateral streak. Forewings rather elongate, light grey, whitish-mixed, with obtusely angulated rather dark fuscous striae; veins partially black-marked, especially towards posterior edge of median band; fifth and sixth fasciae interrupted above and below middle; a suboval black discal spot. Hindwings grey-whitish, with indistinct grey striae; a dark grey discal dot and dorsal subbasal spot.

Britain to the Clyde, Ireland, common; C. Europe; 5, 6. Larva slender, dull green; dorsal line purplish-red, double, on 5-8 with a reddish U-shaped mark filled with ochreous; spiracular dark purplish-red; incisions yellowish: on hawthorn, ash, *Salix*, etc.; 8-10.

33. **T. irriguata**, *Hb.* 18-21 mm. Abdomen with black lateral spots and subbasal band. Forewings elongate, ochreous-

whitish, in disc white, with faint bent fuscous striae; all fasciae forming dark fuscous spots on costa, second, fifth, and sixth suffused with fuscous throughout; two or three median striae often darker; a black transverse discal spot. Hindwings whitish, with grey striae, usually faint except two last; a blackish discal dot and dorsal subbasal spot.

S. England to Hereford and Norfolk, local; C. Europe; 4, 5. Larva light yellow; a dorsal series of brown trident-shaped marks on 5-10, and indistinct line; subdorsal line brown: on oak and blackthorn; 6.

34. **T. insigniata**, *Hb.* (*consignata*, Bkh.) 20-22 mm. Thorax brown, with white central stripe. Abdomen dark fuscous. Forewings rather elongate, pale greyish-ochreous, veins partly blackish; two pairs of blackish-edged whitish sinuate striae limiting median band, second posteriorly ferruginous-edged; a ferruginous-brown costal blotch before first pair, and another beyond second; three brown median striae, ending in a dark fuscous costal suffusion; a large black discal mark touching this. Hindwings whitish-grey; a discal dot and two posterior striae grey.

S. England to Hereford and Norfolk, local; C. Europe; 5, 6. Larva slender, green; dorsal line slender, purplish-red, enlarged at base of each segment into a spearhead-shaped yellow-edged blotch; spiracular purple-marked on median segments; incisions yellowish: on apple and hawthorn; 6-8.

35. **T. fraxinata**, *Crewe* (*innotata*, Stt.) 17-21 mm. Abdomen with black lateral streak. Forewings elongate, light brownish-grey, with indistinct brown angulated striae, sometimes dark fuscous on costa; veins before upper half of posterior edge of median band black-marked; a black discal mark; a small whitish tornal dot. Hindwings grey-whitish, dorsally and posteriorly with obscure grey striae; a grey discal dot.

Britain to the Clyde, local; Germany; 6, 7. Larva slender, green, pale yellow-brown, or reddish-purple; dorsal line purple-red, dark green, or absent, sometimes enlarged into arrowhead-shaped blotches; subdorsal sometimes yellow or orange or formed of whitish spots; sometimes a lateral series of purple blotches; spiracular yellow, often purple-marked: on ash; 8, 9.

36. **T. innotata**, *Hufn.* 22-23 mm. Differs from *T. fraxinata* as follows: forewings with striae more distinct, subterminal line distinct, white, interrupted, forming a V-shaped tornal mark.

Devon to Lincoln, on coast sandhills, local; C. and S. Europe, WC. Asia; 6, 7. Larva pinkish-grey or ochreous-whitish, partly suffused with orange; dorsal line purple-reddish or brown, with a series of rounded white-edged blotches; a lateral series of orange-red and purplish spots; spiracular line whitish; head dull purplish: on *Artemisia;* 8-10.

37. **T. sobrinata**, *Hb.* 18-19 mm. Abdomen without markings. Forewings brownish-grey or brown, sometimes faintly reddish, with indistinct angulated darker or fuscous striae; veins on median band towards edges, and basal half of median vein black-marked; a transverse black discal spot, posteriorly whitish-edged, adjoining a darker median stria; subterminal line whitish, forming a distinct tornal mark. Hindwings light brown, paler costally, with grey sometimes obsolete striae; a grey discal dot.

Britain to Ross, N. Ireland, common; N. and C. Europe; 7, 8. Larva green; dorsal line darker green or purple, sometimes with a series of dull crimson whitish-edged subquadrate spots; spiracular whitish: on *Juniperus;* 5, 6.

38. **T. helveticaria**, *B.* (*arceuthata*, Frr.; *egenaria*, HS.) 20-24 mm. Abdomen with fuscous subbasal band. Forewings rather elongate, light brownish-grey, with variably distinct fuscous sinuate striae; veins partially marked with blackish and sometimes with whitish; a transverse black discal mark; subterminal line obscure, sometimes forming a whitish tornal dot. Hindwings light brownish-grey, with very faint grey striae; a dark grey discal mark; cilia conspicuously barred.

Bucks to Aberdeen, very local; N. and WC. Europe; 4, 5. Larva rather stout, green; dorsal line darker; subdorsal darker, edged above with pale yellowish; spiracular pale yellowish; incisions yellowish; head green or dull purplish: on *Juniperus;* 7-10.

39. **T. nanata**, *Hb.* 19-21 mm. Abdomen with brownish subbasal band and blackish lateral spots. Forewings elongate, grey, with dark fuscous angulated striae; fasciae separated by pairs of white striae; veins partly black-marked; subterminal line white, forming a tornal spot; a black discal mark, preceded by a white spot; an oblique whitish apical dash. Hindwings pale grey, whitish-mixed, with grey striae only distinct dorsally; a grey discal dot; cilia conspicuously barred.

Britain to the Shetlands, Ireland, common; C. Europe; 5, 6. Larva slender, green; a dorsal series of white M-shaped marks, partly purple-edged; a spiracular series of white marks: on flowers of *Erica* and *Calluna;* 8, 9.

40. **T. extensaria**, *Frr.* 22-24 mm. Abdomen with fuscous lateral spots. Forewings elongate, light ochreous-brown, whitish-mixed, with indistinct brown angulated striae, on costa black-marked; third, fourth, and fifth fasciae ochreous-brown, black-marked on veins, third and fifth preceded by white fasciae, median space suffused with whitish; subterminal line white; an indistinct blackish discal dot. Hindwings grey, paler towards base, with a whitish postmedian fascia; cilia conspicuously barred.

Norfolk, York, on coast sandhills, very local; EC. Europe, WC. Asia; 6. Larva green; subdorsal line whitish; spiracular white, sometimes edged beneath with pinkish-brown: on *Artemisia maritima*; 7-9.

7. EUCYMATOGE, *Hb.*

Face with short cone of scales. Antennae in ♂ ciliated. Palpi rough-scaled. Abdomen crested throughout, sometimes slightly. Forewings: areole double. Hindwings: 8 anastomosing with cell to beyond middle.

Less numerous than the preceding but more generally distributed, ranging into Australia. Naturally transitional between *Hydriomena* and *Tephroclystis*, it closely approaches both.

1. Forewings with rather large black discal spot 3. *togata.*
   ,, ,, discal dot small or obsolete . 2.
2. Lower part of median band darker than upper 4. *vitalbata.*
   Median band uniform . . . . 3.
3. Abdomen with black subbasal ring . 5. *tersata.*
   ,, without black ring . . . 4.
4. Hindwings whitish, with dark grey border 2. *scabiosata.*
   ,, greyish . . . 1. *subnotata.*

1. **E. subnotata**, *Hb.* 21-23 mm. Forewings light ochreous brown, sometimes whitish-mixed, with indistinct curved fuscous striae; subterminal line slender, whitish; a small blackish discal dot. Hindwings whitish-grey, with indistinct grey striae, towards tornus ochreous-tinged.

England to York, Kirkcudbright, rather common; C. Europe; 7. Larva green or reddish-grey, white-dotted; a dorsal series of darker green lozenges; spiracular line yellow: on flowers and seeds of *Atriplex* and *Chenopodium*; 8, 9.

2. **E. scabiosata**, *Bkh.* (*subumbrata*, Gn.) 19-21 mm. Forewings pale grey, whitish-mixed, with curved fuscous striae; costa suffusedly darker, first four fasciae dark grey towards

costa; fifth and sixth wholly dark grey, subterminal line whitish. Hindwings whitish, with grey striae dorsally; a dark grey terminal fascia and discal dot.

England to York, N. and W. Ireland, local; C. Europe, WC. Asia; 6. Larva slender, green; dorsal line dark green; subdorsal indistinctly darker; spiracular pale green; incisions yellow; 13 with two purple points; head ochreous: on flowers of *Scabiosa*, *Centaurea*, *Gentiana*, etc.; 8, 9.

3. **E. togata**, *Hb.* 21-24 mm. Abdomen with brown-red subbasal band and black lateral spots. Forewings light ochreous-greyish, with indistinct curved fuscous striae; an angulated black subbasal stria; edges of median band black-marked, stronger on costa, posterior angulated in middle; second and fifth fasciae reddish-fuscous, sixth fuscous; an oval black discal spot. Hindwings as forewings, but all markings greyer, less distinct.

Britain to Caledonian Canal, W. Ireland, local; N. and C. Europe; 6. Larva flesh-colour; head and tubercles black: in cones of *Pinus abies;* 8-10.

4. **E. vitalbata**, *Hb.* 28-32 mm. Head and front of thorax dark fuscous. Forewings pale ochreous, with curved brown striae, nearly obsolete on a broad subcostal band; costa suffused with dark fuscous basally; median band suffused with ochreous-brown or dark fuscous on lower half, the suffusion extending to termen beneath apex; a black discal dot. Hindwings whitish-ochreous, with brownish striae; those of median band dark fuscous on lower half; a blackish discal dot.

S. England to Hereford and Leicester, local; C. and S. Europe, Asia Minor, Africa; 5, 6, 8. Larva slender, pale pinkish-ochreous; dorsal line dark brown, broader on 2-4 and 11-13; spiracular pale: on *Clematis vitalba;* 6, 7, 9, 10.

5. **E. tersata**, *Hb.* 28-33 mm. Abdomen with slender black subbasal ring. Forewings light ochreous-brown, with curved darker brown striae; a subbasal stria and edges of median band somewhat blackish-marked, anterior edge thickened dorsally; subterminal line obscurely whitish; a black discal dot; a short blackish apical dash. Hindwings as forewings, but paler, without apical dash.

S. England to Hereford and Norfolk, common; C. and S. Europe, WC. and N. Asia, Japan; 6, 7. Larva pale brown; dorsal line dark brown on 2-4, thence grey on incisions; a black spot on 10, and often indications on 7-9; spiracular line pale, dark-edged: on *Clematis vitalba;* 8, 9.

8. Collix, *Gn.*

Face with short cone of scales. Antennae in ♂ ciliated. Palpi rough-scaled. Abdomen slightly crested throughout. Forewings: areole double. Hindwings in ♂ with long subcostal hair-pencil from base on upper surface, lying beneath forewing; 8 anastomosing with cell to beyond middle.

Only the single species is known; it is probably correlated with or derived from the preceding.

1. **C. sparsaria**, *Hb.* 22-24 mm. Forewings light brownish-grey, with indistinct darker irregular striae, dark fuscous on costa; veins marked with blackish and whitish except within median band; subterminal line whitish, forming a white tornal dot; a black discal dot, connected with costa by a dark fuscous streak. Hindwings as forewings, but without discal dot or costal darker markings; termen dentate.

Hants, Suffolk, Norfolk, Cambridge, York, Cheshire, local; C. Europe; 6. Larva pale green; dorsal line dark green; subdorsal and lateral whitish; spiracular broad, white: on *Lysimachia vulgaris*; 8, 9.

9. Eucestia, *Hb.*

Face forming an obtuse prominence. Antennae in ♂ ciliated. Palpi rough-scaled. Anterior tibiae with horny apical hook. Forewings: areole double. Hindwings in ♂ with transparent basal subdorsal spot, bordered beneath by short membranous bladdery ridge, forming small pocket on lower surface; 3 and 4 sometimes stalked in ♂, 8 anastomosing with cell to beyond middle or in ♂ sometimes connected by bar beyond middle only.

A genus of some extent, ranging through Europe and Asia; derived from *Hydriomena*.

1. Forewings with pale subcostal streak from near base . . . 1. *spartiata*.
,, without such streak . . . 2.
2. Edges of median band distinct . . . 3.
,, ,, ,, obsolete . . 3. *griseata*.
3. Fourth fascia angulated above middle . 4. *plagiata*.
,, ,, not angulated above middle 2. *rufata*.

1. **E. spartiata**, *Fuesl.* 32-35 mm. Forewings elongate, rather dark brown; a median series of three blotches outlined with brownish-ochreous, discal one including a whitish dash and dark fuscous spot; a whitish or brownish-ochreous subcostal streak from near base to apex; subterminal line whitish,

sixth fascia ochreous-brown. Hindwings elongate, brownish-grey, darker apically.

Britain to Ross, N. Ireland, common; WC. Europe; 9, 10. Larva green; dorsal line darker, pale-edged; subdorsal very dark green, yellowish-edged above; spiracular white; incisions yellowish: on *Cytisus;* 5, 6. The imago curiously resembles the dried open seed-pods of the food-plant.

2. **E. rufata**, *F.* (*obliquaria*, Bkh.) 31-33 mm. Forewings elongate, light fuscous; an angulated dark fuscous subbasal line, antemedian space ochreous-suffused; edges of median band bisinuate, black-marked, posterior wholly black on upper half, followed by a pale ochreous shade continued beneath costa to apex; subterminal line whitish, sixth fascia brownish-ochreous. Hindwings elongate, grey; a faint darker discal dot.

Britain to Ross, local; C. Europe, Asia Minor; 5-7. Larva dull olive-green; dorsal line darker, pale-edged; subdorsal dark green, pale-edged beneath; lateral pale; spiracular white: on *Cytisus;* 7-9.

3. **E. griseata**, *Schiff.* 26-30 mm. Forewings elongate, grey-whitish, thickly sprinkled with grey; a somewhat darker praesubterminal shade, running to apex; cilia white. Hindwings elongate, whitish-grey; cilia white.

Suffolk, Norfolk, very local; C. and SW. Europe, Asia Minor; 6, 7. Larva green; a dorsal series of purplish blotches; dorsal line darker green or brown; subdorsal pale, darker-edged; spiracular pale yellow: on *Sisymbrium* and *Erysimum;* 7, 8.

4. **E. plagiata**, *L.* 34-38 mm. Forewings grey-whitish, much fuscous-sprinkled, with indistinct fuscous striae; first fascia of one dark fuscous stria, forming a dark brown costal spot; striae of third and fourth dark fuscous, sometimes suffused with brown, darker on costa, fourth angulated below costa, followed above middle by an ochreous tinge; subterminal line pale; an ochreous-brownish oblique apical streak; a grey discal mark. Hindwings pale fuscous; a darker discal dot and faint postmedian line.

Britain to the Orkneys, Ireland, common; Europe, W. Asia; 5, 6, 8, 9. Larva reddish-ochreous, with numerous reddish-brown lines; spiracular pale yellow; incisions yellowish; head pale brown: on *Hypericum;* 7, 10-4.

10. CARSIA, *Hb.*

Face prominent. Antennae in ♂ ciliated. Palpi rough-scaled. Forewings: areole double. Hindwings in ♂ with transparent basal subdorsal spot, bordered beneath by short membranous bladdery ridge, forming small pocket on lower surface; 8 anastomosing with cell shortly beyond middle.

The single species is closely correlated with *Eucestia.*

1. **C. paludata,** *Thnb.* (*imbutata,* Hb.) 22-26 mm. Forewings brown-grey, densely whitish-sprinkled, with faint darker striae; third and fourth fasciae sometimes brown, edges of median band dark fuscous, anterior straight, posterior angulated below costa and in middle, followed by a white line, angles surrounded by a rosy-ochreous suffusion; fifth fascia obscure, rather dark fuscous, running to apex; a grey discal mark; cilia sharply barred. Hindwings pale grey, rosy-tinged.

Warwick and Stafford to the Shetlands, common; N. and mountains of C. Europe, N. Asia, N. America; 7. Larva reddish-brown; dorsal and subdorsal lines darker; spiracular yellow, marked with red spots, on 2 and 3 black-edged above; subspiracular black; head dull pink: on *Vaccinium;* 5, 6.

11. CALOCALPE, *Hb.*

Face with cone of scales. Antennae in ♂ ciliated. Palpi rough-scaled. Forewings: areole double. Hindwings in ♂ with deep dorsal fold beneath, containing large lateral hairtuft posteriorly; 8 anastomosing with cell to beyond middle.

A small genus, but extending throughout the northern hemisphere and S. America; derived from *Hydriomena.*

Cilia white-spotted	2. *undulata.*
„ not white-marked . . .	1. *certata.*

1. **C. certata,** *Hb.* 37-40 mm. Forewings light ochreous-brown, with darker or dark fuscous striae; third and fourth fasciae darker, sometimes suffused with dark brown, fourth obtusely angulated below costa and in middle; subterminal line obscurely whitish; a black oblique discal mark. Hindwings light ochreous-brownish, with curved darker striae; a dark grey discal dot; termen dentate.

England to York, rather common; C. Europe, WC. Asia to N. Persia, Japan; 5. Larva pinkish-grey, blue-grey, or ochreous; subdorsal and lateral lines whitish, formed of small streaks; spiracular white, marked with orange spots; head ochreous-brown: on *Berberis;* 6, 7.

2. **C. undulata,** *L.* 28-32 mm. Forewings pale whitish-ochreous, with sharp waved dark fuscous striae; fasciae brownish, sixth ochreous-brown; two median striae partly

joined to form rings; subterminal line whitish; a blackish discal mark; cilia white-spotted. Hindwings as forewings, but basal $\frac{2}{5}$ light fuscous, without striae, discal dot dark fuscous; termen subdentate.

England, rather local; N. and C. Europe, N. Asia, N. America; 6, 7. Larva reddish-brown; spiracular line pale; subspiracular dark brown; head pale brown: on *Salix* and aspen; 8, 9.

12. PHILEREME, *Hb.*

Face with cone of scales. Antennae in ♂ ciliated. Palpi rough-scaled. Abdomen in ♂ with claspers extremely large, exserted. Forewings: areole double. Hindwings: 8 anastomosing with cell to beyond middle.

Besides the two following, an allied but doubtfully congeneric species is found in Japan; the genus may be correlated with the preceding.

Median band dark fuscous, posterior edge acutely
angulated . . . 2. *rhamnata.*
" " not darker, posterior edge obtusely
angulated . . . 1. *vetulata.*

1. **P. vetulata,** *Schiff.* 22-28 mm. Forewings fuscous, with indistinct darker striae; posterior edge of median band angulated near costa, followed by one or two whitish-ochreous costal marks; a dark fuscous discal dot. Hindwings fuscous-grey, with faint darker striae and discal dot; termen subdentate.

England to Westmoreland, common; C. Europe, N. Asia; 6, 7. Larva rather stout, blackish; subdorsal and lateral lines white; spiracular ochreous-yellow, black-spotted: on *Rhamnus;* 5, 6.

2. **P. rhamnata,** *Schiff.* 27-35 mm. Forewings ochreous-brown or dark brown, with darker angulated striae, on costa sometimes separated by pale greyish-ochreous marks; median band dark fuscous, posterior edge acutely projecting beneath costa; subterminal line sometimes pale greyish-ochreous; a blackish discal dot. Hindwings as forewings, but median band not darker, posterior edge dark fuscous, obtusely angulated; termen dentate.

England to York, rather common; C. Europe, Asia Minor; 7. Larva yellowish-green; dorsal line darker; subdorsal paler; spiracular pale yellowish, on 10-13 purple-edged beneath; 13 purple above; spiracles red: on *Rhamnus;* 5, 6.

13. EUSTROMA, *Hb.*

Face with cone of scales or nearly smooth. Antennae in ♂ ciliated. Palpi rough-scaled. Forewings in ♂ with strong subdorsal hair-pencil from base beneath, sometimes partially clothing 1b; areole double. Hindwings: 8 anastomosing with cell to beyond middle.

A limited group, characteristic of northern temperate regions; derived from *Hydriomena*.

1. Forewings brown or dark fuscous . . 2.
,, yellowish or reddish-grey . . 3.
2. Veins mostly white . . . 1. *reticulata.*
,, not white . . . . 2. *prunata.*
3. Cilia sharply barred . . . 3. *associata.*
,, not barred . . . . . 4.
4. Anterior edge of median band right-angled 5. *testata.*
,, ,, ,, not right-angled 4. *populata.*

1. **E. reticulata**, *F.* 21-24 mm. Forewings dark fuscous, veins except near costa ochreous-white; seven ochreous-white transverse lines, first nearly straight, second to fourth acutely angulated below middle, fifth strongly curved; an ochreous-white oblique apical streak to seventh; an ochreous-whitish irroration before seventh except towards costa. Hindwings pale fuscous, with whitish postmedian and subterminal lines; in ♂ a round yellow-ochreous discal spot, in ♀ a dark grey dot.

Westmoreland, Cumberland, very local; C. Europe, N. Asia; 7. Larva slender, yellow-green, tinged with pink or slate-colour; dorsal line brown-red; subdorsal whitish; spiracular fine, white; spiracles pink: on *Impatiens noli-me-tangere;* 8-10.

2. **E. prunata**, L. (*ribesiaria*, B.) 32-38 mm. Forewings brown or ochreous-brown, with indistinct darker striae; second fascia posteriorly white-edged, angulated below middle; median band suffusedly darker, white-edged, anterior edge angulated in middle, posterior with a rounded double median projection; subterminal line white, preceded by dark fuscous spots; a semi-oval dark fuscous white-edged subapical blotch. Hindwings grey; costa and three waved posterior lines whitish.

Britain to the Orkneys, Ireland, common in gardens; N. and C. Europe, N. Asia, N. America; 7. Larva green or dull brown; 3 dilated, with a transverse purplish or darker brown pale-dotted ring; a dorsal series of whitish purple-edged brown-centred triangles: on currant and gooseberry (*Ribes*); 5, 6.

3. **E. associata**, *Bkh.* (*dotata*, Gn., non L.) 29-34 mm. Forewings pale ochreous-yellow, with deep ochreous-yellow striae, two median joining to form rings; posterior edge of second fascia ferruginous, acutely angulated above middle; edges of median band dark ferruginous, anterior angulated above middle, posterior with angular median projection; a pale blotch above a dark ferruginous oblique apical streak; cilia sharply barred. Hindwings whitish-yellowish.

England to York, Renfrew, rather common in gardens; C. Europe, N. Asia; 7. Larva slender, pale yellowish-green; dorsal line darker; spiracular pale yellow: on currant (*Ribes*); 5, 6.

4. **E. populata**, *L.* 29-33 mm. Forewings ochreous-yellow, with indistinct brownish striae obsolete towards costa; a yellowish-brown basal patch, edge obtusely angulated; median band yellowish-brown, edges darker, anterior curved, posterior with rounded double median projection; a yellowish-brown subapical blotch, suffused beneath. Hindwings pale greyish-yellowish; termen brownish.

Britain to the Orkneys, Ireland, common; N. and C. Europe, N. Asia, N. America; 7. Larva slender, 3 dilated; green or brown, with darker and whitish longitudinal marks; a dorsal series of whitish V-shaped marks, on 8-10 much larger and more distinct: on *Salix* and *Vaccinium;* 5, 6.

5. **E. testata**, *L.* 29-33 mm. Forewings light reddish-grey, sometimes suffused with ochreous-yellowish, with faint darker striae; basal patch somewhat darker, edge obtusely angulated; median band somewhat darker, edges dark ferruginous, right-angled in middle, posterior waved below it, whitish-edged; a semioval ferruginous subapical blotch, white-edged above. Hindwings grey-whitish; a light reddish-grey terminal fascia.

Britain to the Shetlands, Ireland, common; N. and C. Europe, N. Asia, N. America; 7, 8. Larva pale brownish-ochreous; dorsal line brown; subdorsal white, brown-edged above; lateral white, edged with red-brown; spiracles black, conspicuous; incisions pinkish: on *Salix*, birch, *Calluna;* 5, 6.

14. PLEMYRIA, *Hb.*

Face with slight cone of scales. Antennae in ♂ ciliated. Palpi rough-scaled. Forewings: areole simple. Hindwings: 8 anastomosing with cell to beyond middle.

A considerable genus, nearly cosmopolitan, but apparently most numerous in South America. It is immediately derived from *Hydriomena*.

1. Cilia sharply barred to base . . . 2.
„ imperfectly or not barred . . . 3.
2. Markings black . . . . 2. *hastata.*
„ partly brown . . . 3. *tristata.*
3. Hindwings with grey median striae . . 4.
„ without grey median striae . 1. *bicolorata.*
4. Projection of median band double . 6. *galiata.*
„ „ „ single . . . 5.
5. Postmedian band of hindwings clear white 4. *rivata.*
„ „ „ divided by a grey stria . 5. *sociata.*

1. **P. bicolorata**, *Hufn.* (*rubiginata*, F.) 20-25 mm. Forewings white; a brown basal patch, edge slightly curved; median band brown, usually interrupted or absent on lower half; a black discal spot; fifth and sixth fasciae grey, darkest on a subapical patch. Hindwings white; a dark grey discal dot; a grey terminal band, including whitish subterminal line. A variety occurs not uncommonly with the wings more or less wholly suffused with grey.

Britain to Ross, Ireland, common; N. and C. Europe, WC. and N. Asia; 7. Larva slender, green; dorsal line darker; spiracular greenish-yellow; 13 with two points: on alder, blackthorn, etc.; 5, 6.

2. **P. hastata**, *L.* 25-33 mm. Forewings ochreous-white, markings black; first two fasciae much curved, forming basal patch; median band somewhat white-marked, interrupted below middle, posterior edge angulated in disc; traces of broken strigulae on each side of it; fifth and sixth fasciae rather broad, fifth interrupted in middle; cilia sharply barred. Hindwings as forewings, but basal $\frac{2}{3}$ suffused with blackish-grey, subterminal line partly obsolete.

Britain to the Hebrides, S. Ireland, rather common; N. and C. Europe, N. Asia, N. America; 6, 7. Larva deep brown or black; subdorsal line whitish, dull reddish, or absent; a lateral series of crescentic whitish or dull reddish marks: on birch and *Myrica;* 8.

3. **P. tristata**, *L.* 22-23 mm. Forewings ochreous-whitish; first two fasciae curved, ochreous-fuscous, forming basal patch; median band ochreous-brown striated with black, posterior edge with angular median projection; a series of dark fuscous dots beyond this; a black discal spot, partially surrounded with white; fifth and sixth fasciae brown, fifth interrupted in middle; cilia sharply barred. Hindwings as forewings, but base greyer, discal spot less marked.

Britain to Sutherland, Ireland, common (very local in S. England); N. and C. Europe, Asia Minor, N. America; 6. Larva brown; dorsal line black; subdorsal and lateral narrow, white, black-edged: on *Galium;* 7, 8.

4. P. **rivata**, *Hb.* 26-28 mm. Forewings white, partly ochreous-tinged; markings grey, mixed with brown and striated with dark fuscous; a basal patch, edge slightly curved; second fascia cloudy; median band with posterior edge blackish-marked, projecting obtusely in middle; a black discal spot; fifth and sixth fasciae narrowed and more indistinct in middle, anterior edge of fifth even. Hindwings white; basal third grey-sprinkled; three grey median striae, third darker-dotted, obsolete above middle; a blackish discal dot; a grey terminal band, including white subterminal line.

Britain to Perth, S. Ireland, rather common; C. Europe, WC. and N. Asia; 7. Larva dull brown or reddish-brown; dorsal line blackish, white-edged on 2-4 and 10-13, replaced on 5-8 by white U-shaped marks: on *Galium;* 6.

5. **P. sociata**, *Bkh.* (*subtristata*, Hw.; *biriviata*, Stt.) 23-25 mm. Differs from *P. rivata* as follows: grey markings darker, stronger, a well-marked grey stria on each side of median band of forewings (in *P. rivata* indicated only) and beyond median striae of hindwings, anterior edge of fifth fascia distinctly serrate.

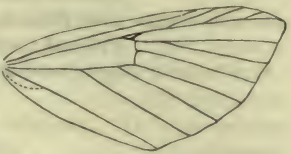
Britain to the Orkneys, Ireland, very common; N. and C. Europe, WC. and N. Asia, N. America; 5, 7. Larva brownish-ochreous; dorsal line dark brown on 2-4 and 11-13, replaced on 5-10 by V-shaped marks of brown and white lines, ending in white spots; sides marked with ochreous-whitish lines: on *Galium;* 6, 8, 9.

6. **P. galiata**, *Hb.* 24-27 mm. Forewings ochreous-white, with light ochreous or grey striae; basal patch brownish, striated with dark fuscous, edge slightly projecting above middle; median band brown striated with black, central space dark grey, posterior edge with rounded double median projection; a small black discal mark; a dark grey costal suffusion before subterminal line; a brownish terminal suffusion above middle. Hindwings ochreous-whitish, with grey striae, sometimes faint; a grey discal dot.

Britain to Perth, Ireland, rather local; C. and S. Europe, WC. and N. Asia, N. Africa; 6. Larva pale reddish-ochreous; dorsal line brownish, on 2-4 and 10-13 dark brown; subdorsal white, brown-edged; spiracular pale, edged with series of brown white-edged marks: on *Galium;* 8, 9.

15. Cataclysme, *Hb.*

Face with somewhat projecting scales. Antennae in ♂ ciliated. Palpi rough-scaled. Forewings: areole double, but posterior wall absent between 7 and 8. Hindwings: 8 anastomosing with cell to beyond middle.



Forewing of *Cataclysme virgata.*

A small genus, attached to the European region.

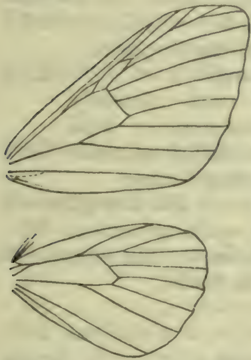
1. **C. virgata**, *Rott.* (*lineolata*, Hb.) 19-22 mm. Forewings fuscous, densely whitish-sprinkled, with nearly straight darker striae; median band limited by nearly straight slender ochreous-brown externally blackish-edged fasciae, preceded and second followed by whitish streaks; a blackish discal dot. Hindwings light grey, with pale bent postmedian and some darker striae.

England to Lancashire, S. Ireland, local; C. Europe, WC. and N. Asia; 5-7. Larva pinkish or brown; dorsal line dark green or brown; subdorsal pale or yellowish; spiracular blackish-grey: on *Galium verum*; 6-9.

16. Hydriomena, *Hb.*

Face with somewhat projecting or loose scales or conical tuft. Antennae in ♂ ciliated, rarely naked. Palpi rough-scaled. Abdomen sometimes crested on 2 basal segments. Forewings: areole double. Hindwings: 8 anastomosing with cell to beyond middle.

A very large genus, principally characteristic of temperate regions in both hemispheres; it is a development from *Xanthorhoe.*



Neuration of *Hydriomena picata.*

1. Forewings yellow or orange . . . 2.
„ not yellow or orange . . . 4.
2. Hindwings orange 36. *bilineata.*
„ pale yellowish 3.
3. Cilia of forewings barred . . . 6. *fulvata.*
„ „ not barred . . 7. *dotata.*
4. Forewings green or olive-greenish . . 5.
„ not greenish . . . . 9.

5. Forewings green . . . . . 6.
,, olive-greenish . . . . 7.
6. Forewings with longitudinal fuscous suffusions 10. *siterata.*
,, without fuscous suffusion . . 9. *miata.*
7. Forewings with clear white postmedian band 8. *picata.*
,, without such band . . . . 8.
8. Posterior edge of median band with central projection
12. *trifasciata.*
,, ,, ,, without central projection 11. *sordidata.*
9. Ground of forewings nearly clear white or whitish 10.
,, ,, not whitish . . . 14.
10. Forewings with whitish median terminal blotch
35. *procellata.*
,, without such blotch . . . 11.
11. Sixth fascia pale brownish-ochreous . 1. *ocellata.*
,, ,, grey . . . . . 12.
12. Forewings with strong black discal spot . 27. *adaequata.*
,, with grey discal dot or none . . 13.
13. Fifth fascia reddish-ochreous-brown . 24. *cuculata.*
,, ,, grey . . . . 25. *albicillata.*
14. Edge of basal patch angulated near dorsum 5. *sagittata.*
,, ,, not angulated near dorsum . 15.
15. Termen of hindwings dentate . . 19. *dubitata.*
,, ,, at most waved . . 16.
16. Posterior edge of median band with right or acute angle . . 17.
,, ,, ,, at most obtusely angulated, or with rounded prominence 22.
17. Angle of median band nearly reaching termen
21. *nigrofasciaria.*
,, ,, not nearly reaching termen 18.
18. Median band followed by white fascia . 26. *unangulata.*
,, ,, not followed by white fascia . 19.
19. Median band wholly dark . . . 20.
,, ,, not wholly dark . . . 21.
20. Posterior angle of median band right . 3. *variata.*
,, ,, ,, acute . 4. *juniperata.*
21. Forewings with anterior striae sharply angulated
38. *polygrammata.*
,, ,, ,, not sharply angulated . 23. *berberata.*

22. Central prominence of median band bifid . . 23.
,, ,, ,, ,, not bifid . 27.
23. Central prominence large . . . . 24.
,, ,, small . . . 25.
24. Forewings with white apical streak . 16. *suffumata.*
,, without white apical streak . 13. *truncata.*
25. Forewings fuscous . . . . 26.
,, pale ochreous . . . 33. *decolorata.*
26. Edge of basal patch distinctly whitish 31. *alchemillata.*
,, ,, ,, not whitish . . 32. *affinitata.*
27. Anterior edge of median band angulated in middle
14. *silaceata.*
,, ,, ,, not angulated in
middle . . 28.
28. Posterior edge of median band blackish on upper
half only . 29.
,, ,, ,, not blackish on
upper half only 30.
29. Edge of basal patch acutely angulated . 20. *badiata.*
,, ,, curved . . 22. *rubidata.*
30. Discal dot of forewings ringed with pale . 37. *fluviata.*
,, ,, not ringed with pale . 31.
31. Forewings rather elongate . . 39. *lapidata.*
,, not elongate . . . . 32.
32. Median band with distinct central prominence . 33.
,, ,, nearly evenly waved . . 36.
33. Median band followed by two strong white striae
34. *albulata.*
,, ,, ,, by one white stria . . 34.
34. Median band grey . . . 28. *minorata.*
,, ,, brown . . . . 35.
35. Edge of basal patch angulated near costa 30. *unifasciata.*
,, ,, hardly bent . . 2. *simulata.*
36. Forewings brown . . . . . 37.
,, yellow-whitish irrorated with dark
fuscous . . . . 38.
37. Forewings with white apical suffused spot 15. *corylata.*
,, without such spot . . 29. *taeniata.*
38. Forewings largely suffused with ochreous-yellow
18. *flavicinctata.*
,, not suffused with yellow . . 17. *caesiata.*

1. **H. ocellata**, *L.* 25-27 mm. Forewings ochreous-white; markings ochreous-brown, mixed with black and leaden-grey; a

small basal patch, edge straight, oblique; median band with posterior edge obtusely angulated above middle; a star-shaped blackish discal spot; some imperfect leaden-grey striae before median band, and towards costa beyond it; a small black praesubterminal spot above middle; a pale brownish-ochreous terminal suffusion, except towards apex. Hindwings ochreous-white; a dark grey discal dot; termen narrowly pale brownish.

Britain to the Orkneys, Ireland, common; Europe, W. Asia; 6. Larva brownish-ochreous, marked with reddish-ochreous; dorsal line reddish-ochreous, traversing white reddish-margined Y-shaped marks on 5-9; spiracular white, reddish-edged above: on *Galium;* 7, 8.

2. **H. simulata**, *Hb.* (*coniferata*, Stt.) 21-22 mm. Forewings brown, faintly reddish-tinged; basal patch darker, edge dark fuscous, hardly bent; median band darker, black-marked on veins, edges dark fuscous, whitish-margined, anterior nearly straight, posterior with rounded projection above middle; a blackish discal dot; subterminal line obscurely white; a blackish subapical and short apical mark. Hindwings pale fuscous.

Sussex, Hants, Bucks, N. England, Scotland to the Orkneys, Ireland, rather common; N. and mountains of C. Europe; 5, 8. Larva rather stout, pale blue-green; dorsal and subdorsal lines green; lateral white; spiracular dark green, brown-edged beneath; subspiracular pale yellowish: on *Juniperus;* 3, 4, 6, 7.

3. **H. variata**, *Schiff.* (*obeliscata*, Hb.) 22-29 mm. Forewings light ochreous-brown, sprinkled with dark fuscous; basal patch ochreous-brown, edge waved, right-angled above middle; median band ochreous-brown or dark fuscous, black-marked on veins, edges dark fuscous, sometimes whitish-margined, anterior angulated in middle, posterior waved, right-angled above middle; a black discal mark; subterminal line obscurely whitish; a cloudy darker apical dash. Hindwings pale fuscous, ochreous-tinged; a darker discal dot; sometimes a curved postmedian line.

Britain to the Hebrides, Ireland, common; N. and C. Europe, N. Asia; 6, 8. Larva blue-green; dorsal line darker, pale-edged; subdorsal yellowish-white, posteriorly yellow; subspiracular yellowish-white; 13 with two points: on *Pinus sylvestris* and *P. abies;* 3-5, 7.

4. **H. juniperata**, *L.* 23-26 mm. Forewings whitish-fuscous, sprinkled with darker fuscous; basal patch darker, edge blackish, waved, right-angled above middle; median band darker, blackish-

marked on veins, edges blackish, whitish-margined, dentate, anterior dentate-angulated in middle, posterior acutely angulated above middle; a blackish discal dot; subterminal line obscurely whitish; a dark fuscous apical dash. Hindwings pale fuscous; a darker discal dot and curved postmedian line.

Surrey, Hants, Suffolk, Scotland to Ross, local; C. Europe; 10. Larva blue-green; subdorsal line broad, yellow; spiracular purple-brown above, white below; spiracles yellow: on *Juniperus;* 7-9.

5. **H. sagittata,** *F.* 24-27 mm. Head brownish-ochreous, fillet white, face black. Forewings brown; a blackish almost basal fascia, posterior edge white-margined, angulated near dorsum; median band blackish, white-margined, anterior edge curved, posterior with strong narrow sharp median projection; subterminal line obscure, forming white marks on costa and middle of termen; cilia barred. Hindwings brownish-grey; a darker discal dot and postmedian line.

Suffolk and Norfolk to Northampton, local; C. Europe; 7. Larva stout, deeply incised, 5-10 more swollen; varying from pale blue-green to bright yellow-green; 2-4 each with two dark dorsal blotches; 5-10 with dark green transverse bands, forming lateral blotches, sometimes rose-pink, black-edged beneath: on seeds of *Thalictrum flavum;* 8, 9.

6. **H. fulvata,** *Forst.* 22-25 mm. Forewings bright deep yellow; basal patch ferruginous-striated, edge curved; median band ferruginous, suffused with dark fuscous towards disc, with a costal yellow blotch, edges dark fuscous, anterior irregular, posterior pale-margined, with truncate median projection; a triangular whitish-ochreous apical spot, edged beneath with dark fuscous and a ferruginous suffusion; cilia barred. Hindwings pale whitish-yellowish.

Britain to the Orkneys, Ireland, common; C. Europe, W. Asia; 7. Larva green; dorsal line greenish-grey, double; subdorsal greenish-grey; spiracular yellow; incisions yellow: on rose; 5, 6.

7. **H. dotata,** *L.* (*pyraliata,* F.) 30-35 mm. Forewings ochreous-yellow; costa dark fuscous towards base; edges of basal patch and median band dark fuscous, angulated above middle; sometimes a fuscous discal dot; praesubterminal line cloudy, fuscous, interrupted; a cloudy fuscous apical dash; cilia dark fuscous except towards tornus. Hindwings pale yellowish; a pale grey discal dot and small tornal spot.

Britain to Ross, E. Ireland, common; N., C., and SE. Europe, WC. and N. Asia; 7. Larva slender, green; dorsal line dark green, yellow-edged; spiracular yellow; incisions yellow: on *Galium;* 4-6.

8. **H. picata,** *Hb.* 28-31 mm. Forewings dull olive-green, black-sprinkled, with black striae; median band somewhat darker, anterior edge curved, posterior with bicuspidate median projection, followed by a clear white band, including a blackish posterior stria; subterminal line white, preceded by a blackish-grey shade interrupted with white beneath costa; a linear black discal mark. Hindwings whitish, striated with grey, basal third suffused with grey; a darker discal dot.

England to Leicester and Denbigh, rather common; C. Europe, WC. Asia; 6, 7. Larva greenish-ochreous or flesh-colour, reddish-marked; a dorsal series of dark blotches, most conspicuous on 7-9; spiracular line grey-speckled; head ochreous-brown, darker-marked: on *Stellaria media* (?); 8, 9.

9. **H. miata,** *L.* 27-30 mm. Forewings dull green, somewhat whitish-mixed, with darker black-marked striae; antemedian and postmedian spaces whitish-striated; edges of median band irregularly sinuate; subterminal line whitish; a darker discal mark. Hindwings greenish-grey-whitish, with several greenish-grey striae; a dark grey discal mark.

Britain to the Orkneys, Ireland, common; N. and C. Europe; 9-5. Larva slender, pale yellow-green; dorsal line dark green; spiracular rather darker yellow-green; incisions yellowish; spiracles white; 13 with two sometimes pink points: on oak, *Salix*, birch, etc.; 6-8.

10. **H. siterata,** *Hufn.* (*psittacata*, Schiff.) 27-30 mm. Differs from *H. miata* as follows: forewings with two broad longitudinal suffused fuscous streaks (appearing reddish-tinged by contrast); hindwings brownish-grey, with several darker striae, and a dark fuscous discal mark.

England, Edinburgh, Ross, N. and E. Ireland, rather common; C. and SW. Europe, Asia Minor; 9-4. Larva yellowish-green; sometimes a dorsal series of red blotches; 13 with two sometimes rosy points: on oak, birch, etc.; 6-8.

11. **H. sordidata,** *F.* (*elutata*, Hb.) 27-33 mm. Forewings dull olive-green, with darker or fuscous strigulae; a fuscous subbasal bar; five irregular rather dark fuscous fasciae, obtusely angulated in or above middle, sometimes interrupted or incomplete, fifth usually interrupted by a green-whitish spot in middle; median band and postmedian space sometimes

suffused with green-whitish; a dark fuscous apical dash: sometimes whole wing suffused with rather dark fuscous; a form occurs with ground-colour ferruginous-ochreous, markings blackish. Hindwings fuscous; a darker discal dot.

Britain to the Orkneys, Ireland, very common; N. and C. Europe, N. Asia, Japan, N. America; 7, 8. Larva brown or blackish; dorsal line double, white; subdorsal and lateral white; spiracular area pale red-brown: on *Salix*, hawthorn, etc.; 4-6.

12. **H. trifasciata**, *Bkh.* (*impluviata*, Hb.; *literata*, Don.; *ruberata*, Frr.) 28-32 mm. Forewings dull olive-green, mixed or strigulated with dark fuscous, sometimes wholly fuscous; edge of basal patch indicated by a blackish oblique line; second and fifth fasciae fuscous, irregular; median band pale, edges dark fuscous, waved, posterior with double rounded median projection; a small dark fuscous discal mark; an oblique subapical series of three or four blackish marks. Hindwings fuscous; a darker discal dot and two postmedian striae.

Britain to the Orkneys, N. Ireland, common; N. and C. Europe, N. Asia, N. America; 5, 6. Larva pinkish-green or pinkish-grey, marked with ochreous or dark brown; dorsal line darker; subdorsal pale, darker-edged; spiracular pale or whitish: on alder, *Salix*, and poplar; 7-9.

13. **H. truncata**, *Hufn.* (*russata*, Bkh.; *immanata*, Hw.) 26-33 mm. Forewings ochreous-brown, marked on veins or wholly suffused with dark fuscous; basal patch dark fuscous, edge angulated above middle, sometimes white-margined; median band dark fuscous, sometimes white-edged, central space often suffused with white, sometimes with yellow-ochreous, posterior edge with double median projection, upper lobe larger, slightly bifid; an oblique black discal mark; subterminal line whitish; sixth fascia mixed with dark fuscous and whitish. Hindwings grey, sometimes ochreous-tinged; a darker discal dot and postmedian angulated stria.

Britain to the Shetlands, Ireland, common; N. and C. Europe, N. and C. Asia, N. America; 5-9. Larva slender, green, with yellow-whitish tubercles; dorsal line dark green; subdorsal pale; sometimes a lateral purple-rosy stripe; 13 with two rosy points: on *Fragaria*, *Polygonum*, sallow, etc.; 4-8. Two forms of this species (often regarded as specifically distinct) are generally but not always distinguishable in Britain, viz. *truncata*, in which the angle of the postmedian stria of the hindwings is obtuse, and *immanata*, in which it is acute; but the species is even more variable in the Asiatic and American portions of its range than it is here, and no distinct line of demarcation can at present be drawn. Probably the two races may be species in process of formation.

14. **H. silaceata**, *Hb.* 25-29 mm. Forewings rather dark fuscous, with darker striae; edge of basal patch whitish, obtusely angulated above middle; veins on antemedian space and beyond median band, usually also on lower half of median band pale ochreous; edges of median band white, anterior angulated in middle, posterior sinuate, followed by a whitish-ochreous stria; a blackish discal mark; subterminal line white, preceded by blackish-fuscous spots; an irregular white-edged blackish-fuscous subapical blotch. Hindwings light grey, with darker striae and discal dot.

Britain to Ross, Ireland, rather common; N. and C. Europe, N. Asia, N. America; 5, 6. Larva slender, pale green; a dorsal series of reddish-brown dots: on *Epilobium* and *Circaea;* 7.

15. **H. corylata**, *Thnb.* 24-28 mm. Forewings yellowish-brown; basal patch rather dark brown, edge white, irregular; median band rather dark brown, sometimes interrupted below middle, edges white, irregularly waved; a blackish discal mark; subterminal line white; a terminal median, and apical spot suffused with white. Hindwings pale whitish-fuscous; a dark grey discal dot; a faint pale darker-edged postmedian fascia.

Britain to Sutherland, Ireland, common; N. and C. Europe, N. Asia; 5, 6. Larva reddish-ochreous, greenish-tinged, with brown tubercles; dorsal stripe of four reddish-brown lines, on 5-10 replaced by dark diamond-shaped marks: on blackthorn, hawthorn, etc.; 7-9.

16. **H. suffumata**, *Hb.* 28-32 mm. Forewings yellowish-fuscous mixed with dark fuscous; basal patch dark brown, edge white, curved: two yellow-whitish striae before and three beyond median band; median band dark brown, anterior edge dentate, posterior with strong double median projection; a black discal mark; subterminal line white, interrupted; a white oblique apical streak. Hindwings light grey, with faint darker striae; an angulated whitish postmedian fascia.

Britain to the Hebrides, Ireland, rather common; N. and C. Europe, NW. Asia; 5. Larva pinkish-grey, greenish-grey, or ochreous-brown; dorsal line pale on 2-4, dark on 10-13; on 5-9 a series of dark grey V-shaped marks ending in pink triangles enclosing a white dot: on *Galium;* 6-8.

17. **H. caesiata**, *Lang.* 31-34 mm. Forewings yellow-whitish, densely sprinkled with dark fuscous, with dark fuscous striae; median band more or less suffused with fuscous, edges curved, strongly waved, whiter-margined; a blackish discal mark; subterminal line whiter; cilia distinctly barred. Hindwings whitish-grey, with two faint posterior striae; a dark grey discal dot.

Devon, Gloucester, Wales, N. England to the Shetlands, Ireland, common on mountains; N. and mountains of C. Europe, NW. Asia, N. America; 6, 7. Larva green or deep reddish-brown; a dorsal series of 7 or 8 V-shaped marks, yellow in front, pink behind, edged with dark brown; dorsal line yellowish or reddish; spiracular white or yellowish: on *Calluna*, *Vaccinium*, etc.; 9-5.

18. **H. flavicinctata**, *Hb.* (*ruficinctata*, Gn.) 31-34 mm. Differs from *H. caesiata* as follows: forewings largely suffused with ochreous-yellow; hindwings more fuscous towards termen.

N. England to Sutherland, on mountains, local; mountains of N. and C. Europe; 7. Larva dark purplish-grey, green, or pale green suffused with dark red; a dorsal series of 7 or 8 V-shaped marks, yellow in front, pink behind, edged with dark brown; dorsal line dark red; spiracular ochreous or pale yellowish: on *Saxifraga aizoides*; 9-5.

19. **H. dubitata**, *L.* 32-40 mm. Forewings rosy-fuscous, with dark fuscous striae; striae limiting basal patch and median band mixed with whitish-ochreous; edges of median band somewhat suffused with darker fuscous, posterior with projection beneath costa and obtusely angulated in middle; a black discal mark; subterminal line pale whitish-ochreous, sometimes obsolete except a stronger tornal mark. Hindwings fuscous, with darker striae, veins pale-marked; a darker discal dot; termen dentate.

Britain to the Clyde, N. Ireland, common; C. Europe, Asia Minor, N. America; 8-4. Larva yellowish-green; dorsal line darker, yellow-edged; subdorsal pale yellow, interrupted; spiracular bright yellow: on blackthorn and *Rhamnus*; 5, 6.

20. **H. badiata**, *Hb.* 28-31 mm. Forewings reddish-ochreous-brown; edge of basal patch dark fuscous, acutely angulated above middle; pairs of pale striae limiting median band, which is formed by dark-striated fasciae enclosing a pale or whitish-ochreous space, anterior, and upper half of posterior edge blackish-fuscous, lower half of posterior strongly waved; a blackish discal dot; an irregular blackish apical dash; a whitish

median subterminal crescent. Hindwings light ochreous-grey, with faint reddish-grey striae; a dark grey discal dot.

Britain to Caledonian Canal, Ireland, common; C. Europe, NW. Asia; 3, 4. Larva green, dark olive-green, pale brown, or purplish; dots white, conspicuous; incisions often yellow; spiracular line yellowish, spiracles black; head orange or pale brown, with two dark spots: on rose; 5-7.

21. **H. nigrofasciaria**, *Gz.* (*derivata*, Bkh.) 27-30 mm. Forewings dull purplish; basal area mixed with ochreous, white, and black; edge of basal patch double, blackish, curved; median band formed by two fasciae enclosing a whitish-suffused space, anterior fuscous, black-striated, posterior formed of three indistinct striae, acutely angulated in middle, so as nearly to reach termen, forming a dark fuscous costal spot, upper half of third blackish; a blackish discal dot. Hindwings grey, terminally purplish; a darker discal dot and two angulated striae.

Britain to Caledonian Canal, E. Ireland, common; C. Europe, W. Asia; 4, 5. Larva slender, pale-green; a long triangular mark behind head, a series of five dorsal diamonds, a transverse bar on 10, a dorsal line posteriorly, and a spot on 13 purple-red: on rose; 6, 7.

22. **H. rubidata**, *F.* 23-28 mm. Forewings brown-reddish; basal patch dark brown, blackish-striated, edge curved; median band formed by dark-striated fasciae enclosing a light fuscous space, anterior, and upper half of posterior edge blackish-fuscous, lower half of posterior dentate-waved; a black discal mark. Hindwings grey, terminally reddish-tinged, with darker striae and discal dot.

England, Arran, rather local; C. Europe, WC. and N. Asia; 6. Larva slender, whitish-ochreous, pale brown, or reddish, with light and dark markings; dorsal line dark, forming a V-shaped mark behind head, and interrupted on 5-9 by light reddish-centred arrowheads: on *Galium*; 7-9.

23. **H. berberata**, *Schiff.* 24-27 mm. Forewings ochreous-brownish mixed with pale greyish-ochreous, with dark fuscous striae; edge of basal patch blackish-fuscous, slightly angulated near costa; median band formed by brown dark-striated fasciae enclosing a pale ochreous-greyish space, anterior, and upper half of posterior edge blackish-fuscous, posterior waved, acutely projecting above and in middle; sometimes a grey discal dot; a blackish-fuscous apical streak. Hindwings ochreous-grey, with darker discal dot and posterior striae.

Essex to Norfolk, Worcester, York, local; C. Europe, WC.

Asia; 5, 8. Larva rather stout, pale brownish-ochreous, brown-marked; dorsal line brown; 6 and 7 each with two small black tubercles; 10-13 nearly whitish above, with dark brown lateral line: on *Berberis;* 6, 9.

24. **H. cuculata,** *Hufn.* (*sinuata,* Hb.)21-27 mm. Forewings ochreous-whitish; basal patch dark fuscous, black-striated, edge curved; antemedian space rosy mixed with dark fuscous; anterior edge of median band formed by a curved dark fuscous fascia, posterior by three faint blackish striae suffused with dark fuscous towards costa, obtusely angulated above and in middle; sometimes a grey discal dot; fifth fascia light reddish-ochreous-brown, sixth pale grey, with a dark grey median suffusion. Hindwings whitish, with a greyish-striated terminal band; a grey discal dot.

Kent to Devon and Norfolk, Perth (?), local; C. Europe, WC. Asia; 6. Larva slender, pale yellow, greenish-tinged; subdorsal line black; head greenish, black-marked: on *Galium verum;* 8.

25. **H. albicillata,** *L.* 30-34 mm. Forewings ochreous-white; basal area to edge of median band dark ochreous-fuscous striated with ashy-grey; edges of median band dark orange-fuscous, anterior sinuate, posterior obtusely angulated in middle, reduced in disc to a fine dark fuscous stria; a dark grey discal dot; fifth and sixth fasciae slaty-grey, fifth dark fuscous towards costa. Hindwings ochreous-white; a dark grey discal dot, postmedian angulated stria, and terminal band.

Britain to the Clyde, Ireland, common; N. and C. Europe, N. Asia, Japan; 6, 7. Larva deep green; dorsal line dark brown, marked with a series of reddish brown-edged triangular spots; spiracular white, towards extremities brown-edged beneath; incisions yellowish; head greenish-brown: on *Rubus, Fragaria,* alder, etc.; 8, 9.

26. **H. unangulata,** *Hw.* 24-26 mm. Forewings brown, mixed or striated with dark fuscous; basal patch darker, reddish-mixed; median band darker, anterior edge whitish-margined, curved, posterior not waved, acutely angulated in middle, concave beneath, followed by a clear ochreous-white fascia; a blackish discal mark; subterminal line white. Hindwings whitish, with faint grey striae; a dark grey discal dot; a terminal dark grey band, including a white subterminal line.

England to York, N. Ireland, rather common; C. Europe, N. Asia, N. America; 6, 7. Larva pale greyish-ochreous, greymarked; dorsal line faintly darker, on 3 and 4 distinct; a black spot on incisions from 4 to 8; lateral line pale, edged with dark grey; head brown, black-marked: on *Stellaria media;* 7, 8.

27. **H. adaequata,** *Bkh.* (*blandiata,* Hb.) 17-20 mm. Forewings whitish, with faint grey striae; basal patch grey on costa, edge black; a rather narrow dark grey striated median band, partially obsolete in disc, posterior edge obtusely prominent above and in middle; a strong black discal spot; fifth and sixth fasciae grey. Hindwings whitish, with faint grey striae; a dark grey discal dot; a grey terminal band.

Surrey, I. of Wight, Worcester, Wales, N. England to the Shetlands, Ireland, local; N. and C. Europe; 5, 6, 8. Larva green or pale brownish; dorsal stripe of three dark crimson lines separated by lighter, united in middle of each segment, sometimes altered to a chain of triangular marks; subdorsal, lateral, and subspiracular lines deep pink; spiracular more yellowish: on *Euphrasia officinalis;* 6, 7, 9.

28. **H. minorata,** *Tr.* (*ericetata,* Stph.) 16-19 mm. Forewings very pale ochreous-greyish, with faint darker striae; basal patch, second, fifth, and sixth fasciae, and median band grey, striated with dark grey; basal patch and median band white-edged, posterior edge of latter obtusely prominent above and in middle; a black discal dot; subterminal line whitish. Hindwings grey; a faint darker discal dot.

Norfolk, N. England to the Orkneys, local, on heaths; Lapland to the Alps; 6, 7.

29. **H. taeniata,** *Stph.* 19-22 mm. Forewings light ochreous-brown, with faint dark fuscous striae, distinct posteriorly; basal patch fuscous, edge blackish, curved, white-margined; median band rather dark fuscous, edges blackish-fuscous, curved, strongly waved, white-margined, more strongly on costa; a blackish discal mark; subterminal line white, interrupted, stronger and indented in middle. Hindwings light fuscous; a dark fuscous discal dot; a pale curved postmedian line.

N. England, Perth, Ireland, local; N. and mountains of C. Europe, Japan, N. America; 6, 7. Larva pinkish-ochreous, incisions browner; a dorsal series of pale rosy lozenges, including blackish wedges: on *Nasturtium* (?); 8, 9.

30. **H. unifasciata,** *Hw.* 17-21 mm. Forewings ochreous-brown, with dark fuscous striae; edge of basal patch dark fuscous, angulated near costa, whitish-margined; median band darker, edges blackish, margined first with a white and then

a pale ochreous stria, posterior edge prominent beneath costa and angulated in middle; sometimes a darker discal spot; subterminal line whitish; a blackish-fuscous interrupted apical streak. Hindwings grey; a darker discal dot; a faint pale angulated postmedian fascia.

Britain to the Clyde, E. Ireland, not uncommon but overlooked; C. Europe; 6, 7. Larva pale grey or greyish-ochreous; dorsal and subdorsal lines blackish, interrupted; lateral brown; spiracular brownish, pale below; subspiracular double, brown; head pale ochreous, brown-marked: on *Bartsia odontites*; 9, 10.

31. **H. alchemillata**, *L.* 17-20 mm. Forewings fuscous or ochreous-brown, with indistinct darker striae; edge of basal patch and two striae before median band obscurely whitish, on dorsum clear white; posterior edge of median band obtusely angulated beneath costa, with short double median projection, followed by two strong white striae; an obscure discal dot; subterminal line obscurely whitish, on costa white. Hindwings grey; a darker discal dot; a faint pale postmedian fascia.

Britain to the Hebrides, Ireland, common; N. and C. Europe, WC. and N. Asia; 6, 7. Larva rather stout, purplish; dorsal line broad, pale yellow; subdorsal and spiracular narrow, pale yellow; head and plate of 2 black: on flowers and seeds of *Galeopsis*; 8, 9.

32. **H. affinitata**, *Stph.* 22-25 mm. Forewings ochreous-fuscous, with darker striae; a hardly paler stria before median band, on dorsum white; posterior edge of median band indented above and below middle to form a usually double short median projection, followed by two strong white striae, second sometimes pale ochreous; a dark fuscous discal dot; subterminal line obscurely whitish, on costa white. Hindwings light fuscous; a darker discal dot; a distinct whitish postmedian fascia.

Britain to Ross, common; N. and NC. Europe; 6. Larva rather stout, pale pinkish-ochreous; dorsal and subdorsal lines darker, interrupted; lateral pinkish; head and plate of 2 black or blackish-brown: on seeds of *Lychnis diurna*; 8.

33. **H. decolorata**, *Hb.* 22-25 mm. Forewings pale ochreous, with ochreous-fuscous striae; edge of basal patch followed by a thick white stria; median band margined by white fasciae, posterior interrupted by a double median projection of the band; subterminal line obscurely whitish, on costa white. Hindwings whitish; a grey postmedian stria; a terminal pale ochreous band.

Britain to the Clyde, Ireland, rather common; Europe, WC. Asia, N. Africa; 6. Larva rather stout, pale greyish-ochreous, sides black-dotted; lateral, spiracular, and subspiracular lines brownish-grey; head and plate of 2 brown: on flowers and seeds of *Lychnis diurna;* 7, 8.

34. **H. albulata**, *Schiff.* 20-22 mm. Forewings pale greyish-ochreous, with grey or fuscous striae; disc before middle sometimes suffused with whitish; posterior edge of median band obtusely prominent above and in middle, followed by two strong white striae; subterminal line white. Hindwings grey-whitish, sometimes with indistinct grey striae, termen grey.

Britain to the Shetlands, Ireland, common; N. and C. Europe, WC. Asia; 5, 6. Larva dull greenish-yellow; dorsal line broad, darker green; spiracular narrow, darker green; head and plate of 2 brown: on seeds of *Rhinanthus crista-galli;* 7, 8.

35. **H. procellata**, *F.* 30-34 mm. Forewings whitish, sometimes with partial grey striae; subcostal vein ferruginous; basal patch dark fuscous, edge curved; median band reduced to a dark fuscous costal blotch; fifth and sixth fasciae dark fuscous, including a whitish median terminal blotch. Hindwings whitish, usually with indistinct grey striae; a dark grey discal dot; termen suffused with fuscous.

S. England to Leicester and Norfolk, rather local; C. Europe, N. and C. Asia, Japan; 6, 7. Larva light brown, darker on 6-9; dorsal line black, reddish-marked, blotched on 6-9, pale-edged; subdorsal, lateral, and spiracular lines darker; head brown, black-marked: on *Clematis;* 8, 9.

36. **H. bilineata**, *L.* 23-28 mm. Forewings deep yellow or orange, with fuscous striae; median band usually finely whitish-edged, sometimes suffused with dark brown towards edges, posterior edge prominent above and in middle; a fuscous discal mark. Hindwings orange, with fuscous striae; sometimes a whitish postmedian stria.

Britain to the Shetlands, Ireland, abundant; Europe, W. and N. Asia; 6, 7. Larva bluish-green; dorsal line darker, whitish-edged; subdorsal and spiracular lines white: on grasses, *Rumex*, etc.; 4

37. **H. fluviata**, *Hb.* (*gemmata*, Hb.) 22-24 mm. Forewings greyish-ochreous or greyish-purple, median area greyer, with some faint darker striae; edge of basal patch, posterior edge of second and anterior edge of fifth fascia, and subterminal line very finely whitish; a dark discal dot in a pale or whitish ring;

sometimes a dark apical streak. Hindwings grey, terminally ochreous or purplish-tinged, with traces of darker or whitish striae.

England to York, E. Ireland, uncommon; C. and S. Europe, C. and S. Asia, Africa, N. America; 7, 9-5. Larva rather stout, greenish; incisions reddish or yellowish; dorsal and subdorsal lines on 2-5 pale, dark-edged; a dorsal series of five diamonds outlined with brown, including a black mark; spiracular line blackish, interrupted: on *Polygonum*, *Agrimonia*, etc.; 5, 6, 8.

38. **H. polygrammata**, *Bkh.* (*conjunctaria*, Ld.) 22-24 mm. Forewings pale greyish-ochreous, with straight dark fuscous striae, sharply angulated near costa except posteriorly; third fascia suffused with fuscous except towards costa, fourth on upper half, sixth except above an oblique apical streak; a black discal dot, often in a pale ring. Hindwings pale greyish-ochreous, with straight rather dark fuscous striae, posteriorly curved.

Cambridge, Gloucester, very local (other records doubtful); C. Europe; 4, 8. Larva on *Galium?*

39. **H. lapidata**, *Hb.* 26-28 mm. Forewings somewhat elongate, pale brownish, with ashy-fuscous striae; edges of median band darker, anterior curved, posterior twice subsinuate, remotely followed by a similar darker stria; a darker central twice sinuate stria; a fuscous discal dot; a darker ashy-fuscous apical streak; termen suffused with ashy-fuscous. Hindwings pale ashy-grey, with some faint darker striae.

Lanark to Sutherland, Ireland, local; N. and WC. Europe, N. Asia; 8, 9. Larva yellow-whitish; dorsal and subdorsal lines formed of grey dots; lateral grey; spiracular broader, darker grey; head grey, dark-speckled: on grasses; 5, 6.

17. PELURGA, *Hb.*

Face with hardly projecting scales. Antennae in ♂ shortly ciliated. Palpi rough-scaled. Thorax with horny rounded anterior dorsal prominence. Forewings: areole double. Hindwings: 8 anastomosing with cell to beyond middle.

The single species is probably correlated to early forms of *Hydriomena*.

1. **P. comitata**, *L.* 26-33 mm. Forewings ochreous-yellow, with deeper ochreous or brown striae; edge of basal patch darker, curved; median band suffused with brown towards

margins, edges dark fuscous, anterior angulated near costa, posterior with rounded median projection; a black discal dot; a dark brown apical streak; cilia barred. Hindwings whitish-ochreous, fuscous-tinged, with faint darker striae.

England, Edinburgh, N. and C. Ireland, rather local; N. and C. Europe, N. Asia; 7. Larva greenish-brown, darker-streaked; 5-7 with a yellow-ochreous spot, marked with dark V-shaped mark; dots white, conspicuous; spiracular line very pale pinkish; head grey: on *Atriplex* and *Chenopodium;* 8, 9.

18. OPEROPHTERA, *Hb.*

Face smooth. Antennae in ♂ strongly ciliated with fascicles. Palpi short, loosely scaled. Forewings: areole simple. Hindwings: 8 anastomosing with cell to beyond middle. Wings of ♀ aborted.

Includes only three or four species, confined to northern temperate regions.

Hindwings pale fuscous . . .	1. *brumata.*
,, whitish	2. *boreata.*

1. **O. brumata**, *L.* 25-28 mm. Forewings light brownish, densely fuscous-sprinkled, with fuscous striae, sometimes partially marked with dark fuscous on veins; basal area and fourth fascia slightly darker. Hindwings pale fuscous, with several faint darker lines. Wings of ♀ shorter than half length of abdomen, grey-whitish mixed with dark fuscous.

Britain to the Shetlands, Ireland, abundant; N. and C. Europe; 10-1. Larva green, greenish-grey, or yellowish; dorsal line darker or almost blackish; subdorsal and spiracular whitish or yellowish; head green, sometimes brown-marked or black: on oak, apple, hawthorn, etc.; 5, 6. The larva is sometimes excessively abundant, and may then become highly injurious in orchards, wholly stripping the trees of leaves.

2. **O. boreata**, *Hb.* 30-33 mm. Forewings very pale greyish-ochreous, densely sprinkled with light fuscous, with faint fuscous striae, those of fourth and fifth fasciae and anterior edge of third distinct; basal area rather darker; veins sometimes partly darker-marked. Hindwings whitish; a faint grey median stria. Wings of ♀ as long as ¾ of abdomen, grey mixed with whitish, forewings with darker blackish-edged band, hindwings with grey bar.

Britain to Ross, somewhat local; C. Europe; 10, 11. Larva pale yellowish-green; dorsal line darker; subdorsal and spiracular whitish; head grey, black-marked: on birch; 6.

19. EUCHOECA, *Hb.*

Face smooth, flat. Antennae in ♂ shortly ciliated. Palpi short, slender, loosely scaled. Forewings: areole simple. Hindwings: 8 anastomosing with cell to beyond middle.

A small genus, containing a few species distributed throughout the northern hemisphere, and one Australian.

1. Ground-colour of forewings whitish . . 2.
„ „ not whitish . . 3.
2. Postmedian striae ferruginous towards costa 4. *Blomeri.*
„ „ not ferruginous . 3. *sylvata.*
3. Cilia sharply barred . . . 2. *obliterata.*
„ not barred . . . . 1. *luteata.*

1. **E. luteata**, *Schiff.* 18-20 mm. Forewings pale yellowish; the six fasciae marked with strong deep ochreous-orange striae, last three twice sinuate, connected by a longitudinal suffusion in middle; a dark fuscous discal dot. Hindwings as forewings, but first three fasciae absent.

England, Argyll, common; N. and C. Europe, N. Asia; 6, 7. Larva on maple and alder; 8-10.

2. **E. obliterata**, *Hufn.* (*heparata*, Hw.) 21-22 mm. Forewings light ochreous, densely sprinkled and posteriorly suffused with fuscous; a clearer costal streak from base to $\frac{3}{4}$; several indistinct fuscous striae, one in middle angulated near costa; cilia distinctly barred. Hindwings as forewings, but without markings.

England, Shetlands, rather common; N. and C. Europe; 6, 7. Larva rather stout, green; a dorsal series of square black yellow-edged spots: on alder; 8, 9.

3. **E. sylvata**, *Hb.* (*testaceata*, Don.) 21-23 mm. Forewings whitish, sprinkled with fuscous, with grey striae; edges of basal patch and median band rather dark brown, posterior thicker on upper half, rather prominent below costa and in middle. Hindwings as forewings, but without markings on basal third.

England, C. Ireland, rather local; C. Europe; 6, 7. Larva yellowish-green; a broad dark purple-brown dorsal stripe, posteriorly rosy, centrally dilated so that on 5-9 it reaches below spiracles, edges darkest and yellow-margined; yellow lateral patches on 5 and 9; dorsal line purple-whitish; on 5-8 purple dorsal spots, connected with whitish V-shaped marks; head and plate of 2 blackish-brown: on alder and *Salix*; 8.

4. **E. Blomeri**, *Curt.* (*pulchraria*, Ev.) 20-23 mm. Fore-

wings whitish, dusted with dark fuscous, with brownish striae; edges of median band partly blackish, posterior prominent above and in middle, the two following striae ferruginous on costal half, thickened; a blackish discal dot. Hindwings whitish-grey, with darker striae.

Sussex, W. and N. England, local; C. Europe; 6, 7. Larva pale yellowish-green; a crimson-brown dorsal patch on 2-4, cut by a yellow central line; subdorsal crimson-brown blotches on 6-8; on 12 and 13 a rosy dorsal brown-marked stripe; markings variable in intensity and sometimes absent; head with two crimson-brown streaks: on elm; 8, 9.

20. ASTHENA, *Hb.*

Face smooth, flat. Antennae in ♂ shortly ciliated. Palpi short, slender, loosely scaled. Forewings: areole double. Hindwings: 8 anastomosing with cell to beyond middle.

A genus of a few widely scattered species, most numerous in the Australian region.

1. Forewings unicolorous . . .	2. *murinata.*
„ with distinct striae . . .	2.
2. Forewings clear white . . .	1. *candidata.*
„ sprinkled with grey or fuscous	3. *dilutata.*

1. **A. candidata**, *Schiff.* 17-20 mm. Forewings white; about eight light greyish-ochreous striae; posterior edge of median band twice sinuate; a grey discal dot. Hindwings as forewings, but without striae towards base.

England, Argyll, Arran, common; C. Europe, Asia Minor; 5, 6. Larva pale yellowish-green, with pale tubercles bearing long black hairs; 3 and 4 pinkish above, 2 and 5-9 with crimson bisected dorsal marks, sometimes partly absent; 10-13 with a crimson dorsal line; head pale, with two black rings: on hazel; 6, 7.

2. **A. murinata**, *Sc.* (*euphorbiata*, F.) 17-21 mm. Forewings light grey-brownish or greyish-ochreous, unicolorous. Hindwings as forewings, or slightly greyer.

England to York, rather common; C. Europe, W. Asia; 6. Larva green or dark grey; dorsal line darker, interrupted; subdorsal and lateral series of pale or yellow spots; head ferruginous: on *Euphorbia*; 8, 9.

3. **A. dilutata**, *Bkh.* (*filigrammaria*, HS.; *autumnaria*, Gn.) 25-36 mm. Forewings grey-whitish, sprinkled and striated with grey or fuscous; the six fasciae marked with darker striae, fourth angulated above middle, third and fourth some-

times suffused with grey or fuscous; veins partially marked with dark fuscous, especially in middle of disc; sometimes a dark fuscous discal dot. Hindwings grey-whitish, posteriorly with grey striae.

Britain to the Orkneys, Ireland, common; N. and C. Europe, WC. and N. Asia, N. America; 9, 10. Larva rather stout, green, often yellow-dotted; dorsal line darker or formed by purple spots; subdorsal sometimes darker; lateral sometimes yellowish; spiracular yellow or whitish, sometimes partly purplish-edged: on oak, birch, blackthorn, etc.; 5, 6.

21. VENUSIA, *Curt.*

Face smooth. Antennae in ♂ bipectinated, apex simple. Palpi loosely scaled. Forewings: areole simple. Hindwings: 8 anastomosing with cell to beyond middle.

There is only one European species; three others are known from New Zealand.

1. **V. cambrica**, *Curt.* 25-28 mm. Forewings whitish, dusted with dark fuscous, with fuscous striae; edges of median band blackish-marked, posterior twice subsinuate, followed by short blackish dashes on veins, especially on a median V-shaped mark. Hindwings whitish, with grey striae on posterior half.

Norfolk, WC. and N. England to Ross, N. Ireland, rather local; N. and C. Europe, N. Asia, Japan, N. America; 6, 7. Larva pale yellowish-green, blotched irregularly with reddish-purple; dorsal line pale yellow: on *Pyrus aucuparia;* 8, 9.

22. XANTHORHOE, *Hb.*

Face with somewhat projecting scales or conical tuft. Antennae in ♂ bipectinated, apex usually simple. Palpi rough-scaled. Forewings: areole double. Hindwings: 8 anastomosing with cell to beyond middle.

A large genus, but less numerous than *Hydriomena* in all regions except New Zealand, where it is dominant. The antennal pectinations are sometimes very short, but then always terminate in long fascicles of cilia.

1. Forewings green . . . . . 2.
„ not green . . . . . 3.
2. Forewings with triangular black costal spots 18. *viridaria.*
„ without black costal spots . 17. *olivata.*

3. Discal spot forming two separate dots . 5. *bipunctaria.*
„ „ not forming two dots . . . 4.
4. Anterior edge of median band twice angulated 2. *cervinata.*
„ „ „ „ not twice angulated 5.
5. Anterior edge of median band angulated in middle 13. *firmata.*
„ „ „ „ not angulated in middle . . 6.
6. Anterior edge of median band angulated or strongly curved near costa 7.
„ „ „ „ evenly curved or straight . . 8.
7. Posterior edge of median band straight . 1. *vittata.*
„ „ „ „ not straight 12. *quadrifasciaria.*
8. Ground-colour of forewings grey . . 4. *plumbaria.*
„ „ „ ochreous or whitish . 9.
9. Basal patch mixed with red . . . 10.
„ „ not mixed with red . . . 14.
10. Ground-colour of forewings white . 14. *montanata.*
„ „ „ pale ochreous . 11.
11. Subterminal line preceded by a double dark spot 12.
„ „ not preceded by a double dark spot . . . . 13.
12. Median band purple, subterminal line distinct 8. *spadicearia.*
„ „ usually blackish, subterminal line obsolete . . . 9. *ferrugata.*
13. Forewings with a dark apical streak . 11. *munitata.*
„ without dark apical streak . 10. *designata.*
14. Median band darkest on upper half . 15. *fluctuata.*
„ „ not darker on upper half . . 15.
15. Ground-colour of forewings ochreous or brownish 16.
„ „ „ whitish-ochreous or whitish . . 17.
16. Subterminal line preceded by two dark spots 7. *didymata.*
„ „ not preceded by two dark spots 3. *limitata.*
17. Hindwings with distinct grey striae . 16. *salicata.*
„ without grey striae . 6. *multistrigaria.*

1. **X. vittata,** *Bkh.* (*lignata,* Hb.) 22-25 mm. Antennal

pectinations very short. Forewings whitish-ochreous, with fuscous striae angulated near costa; two before and two beyond middle suffusedly dark fuscous on lower half; costa fuscous towards base; a strong oblique dark fuscous apical streak; a round black discal dot. Hindwings pale whitish-ochreous, with fuscous striae; a dark fuscous discal dot.

Britain to Ross, N. and E. Ireland, rather local; N. and C. Europe; 5, 6, 8. Larva pale reddish-brown, anteriorly greenish-tinged; dorsal line darker; subdorsal whitish; spiracular marked with lighter and darker brown; head green, grey-dotted: on *Galium*; 7, 9-4.

2. **X. cervinata**, *Schiff.* 30-36 mm. Forewings light ochreous-brownish, with indistinct darker striae; basal patch, median band, and a suffused terminal band reddish-ochreous-brown, finely whitish-dusted; edges of median band suffused with darker fuscous, finely whitish-edged, anterior twice angulate-indented, posterior hardly prominent in middle; subterminal line obscurely whitish. Hindwings light greyish-ochreous, terminally ochreous-brownish; a pale postmedian fascia and subterminal line.

Britain to the Clyde, E. Ireland, rather local; C. Europe, Asia Minor, Syria; 9, 10. Larva pale yellowish-green, white-dotted; dorsal line darker, interrupted; incisions yellow; spiracles black, white-ringed, conspicuous: on *Malva* and *Althaea*; 6, 7.

3. **X. limitata**, *Sc.* (*mensuraria*, Schiff.) 29-33 mm. Forewings ochreous or brownish, with faint or partially distinct darker striae; edge of basal patch darker, curved; median band formed by ochreous-brown fasciae enclosing a fuscous (sometimes posteriorly dark fuscous) space, anterior edge hardly curved, posterior slightly angulated in middle; a black discal dot; a short dark fuscous apical streak; sixth fascia more fuscous. Hindwings fuscous, sometimes whitish-ochreous towards apex; two darker postmedian striae.

Britain to Sutherland, Ireland, common; Europe, WC. and N. Asia; 7, 8. Larva pale pinkish-grey; dorsal line pale grey; subdorsal pale yellow-ochreous, brown-edged; spiracular pinkish; head black-dotted: on *Vicia*; 6.

4. **X. plumbaria**, *F.* (*palumbaria*, Bkh.) 28-31 mm. Forewings pale grey, sprinkled with dark fuscous; edge of basal patch dark fuscous, hardly curved; median band sometimes partially suffused with dark fuscous, edges dark fuscous, finely ochreous-margined, anterior almost straight, posterior slightly

bent near costa; a black discal dot; a dark fuscous apical streak. Hindwings light grey; a darker discal dot and postmedian line.

Britain to Ross, Ireland, common; C. Europe, Asia Minor; 6, 7. Larva pale grey; dorsal and subdorsal lines dark, interrupted, sometimes confluent; some irregular lateral lines: on *Erica*, *Cytisus*, *Ulex*, etc.; 9-5.

[*X. moeniata*, Sc., a species resembling *X. plumbaria*, but with the posterior edge of median band broadly dark fuscous and forming a strong sharp triangular median projection, is said to have occurred once many years ago in Cumberland; whether the specimen was a chance straggler, or there was some error, is now hardly determinable.]

5. **X. bipunctaria**, *Schiff.* 29-32 mm. Forewings grey-whitish, with grey striae, veins ochreous-tinged; edge of basal patch darker, curved; median band suffused with brownish towards edges, anterior edge curved, posterior with slight double median prominence; two transversely placed black discal dots; a fuscous apical streak. Hindwings grey, with faint paler and darker posterior striae.

England, Arran, rather local; C. and S. Europe, WC. Asia to N. Persia; 7, 8. Larva greyish, tinged with yellow-green; dorsal and subdorsal lines dark green; lateral double, indistinct; spiracles reddish; a spiracular row of black dots; head pale brown, darker-dotted: on *Lotus* and *Trifolium*; 9-5.

6. **X. multistrigaria**, *Hw.* 23-28 mm. Forewings whitish-ochreous, sprinkled with dark fuscous, veins more ochreous, with fuscous striae, marked with dark fuscous on veins and margins; second to fifth fasciae somewhat darker; posterior edge of median band somewhat angulated beneath costa, and with slight double prominence in middle; a fuscous discal dot. Hindwings ochreous-whitish, sprinkled with fuscous posteriorly.

Britain to Caledonian Canal, N. and C. Ireland; Holland to N. Spain; 3, 4. Larva pinkish-ochreous; dorsal, subdorsal, and two lateral lines reddish-brown; spiracles black; head fuscous: on *Galium*, *Asperula*, etc.; 5, 6.

7. **X. didymata**, *L.* 24-26 mm. Forewings ochreous-brown, with dark fuscous striae; median band limited by fasciae mixed with whitish; a dark fuscous discal dot; subterminal line whitish, preceded by two dark fuscous spots above middle, and followed by a subapical dark spot. Hindwings grey, with pale postmedian band and indistinct darker striae; a dark grey discal dot.

Britain to the Shetlands, Ireland, common; N. and C. Europe; 6, 7. Larva dull green, sides paler; dorsal and subdorsal lines darker; spiracular edged with yellowish-white: on *Primula*, *Teucrium*, etc.; 4, 5.

8. **X. spadicearia**, *Bkh.* (*ferrugaria*, Hw.) 21-24 mm. Forewings whitish-ochreous, with dark fuscous striae; basal patch carmine-purple; second fascia ferruginous; median band carmine-purple, dark-striated, whitish-edged, posterior edge projecting in middle; a dark fuscous discal dot; fifth fascia more or less ferruginous, sixth greyish-ochreous; subterminal line whitish, preceded by a small double dark fuscous spot above middle. Hindwings grey, with pale and darker striae; a dark grey discal dot. Hook of genital prensor smooth-edged.

Britain to the Hebrides, Ireland, very common; N. and C. Europe; 5, 6, 8. Larva pale greyish-ochreous, marked with reddish-brown; dorsal line dark brown, on 6-9 with a series of four black spots in paler lozenges; three lateral waved brown lines; subspiracular waved, brown, with five black spots: on *Nepeta glechoma*, *Galium*, etc.; 7, 9.

9. **X. ferrugata**, *L.* (*unidentaria*, Hw.) 22-24 mm. Differs from *X. spadicearia* as follows: forewings with basal patch blackish-edged, median band almost always blackish, posterior edge with stronger double prominence, discal mark linear, black, subterminal line almost obsolete; hook of genital prensor serrate-edged.

Britain to Argyll, N. Ireland, common; N. and C. Europe, N. Asia, N. America; 5, 6, 8. Larva resembling that of *X. spadicearia*, and on same food-plants; 7, 9. Abroad this species has the median band as often reddish-purple as blackish.

10. **X. designata**, *Rott.* (*propugnata*, F.) 22-25 mm. Antennal pectinations very short. Forewings pale greyish-ochreous, sometimes whitish-mixed, with indistinct dark fuscous striae; basal patch brown-reddish, edge blackish, curved; median band reddish-fuscous, dark-striated, sometimes very narrow, anterior edge and upper half of posterior suffused with blackish-fuscous, posterior prominent below costa and angulated in middle; a dark fuscous discal dot; subterminal line pale, preceded by a reddish-fuscous costal spot. Hindwings greyish, with pale and darker striae; a darker discal dot.

Britain to Ross, N. Ireland, common; N. and C. Europe, N. Asia, N. America; 5, 6, 8. Larva brownish-ochreous, suffused with dark fuscous; dorsal line darker, with a series of blackish spots preceded by variable pale marks; subdorsal and lateral greyish: on *Brassica*, but must also have other food-plants; 7, 9.

11. **X. munitata**, Hb. 26-29 mm. Forewings pale greyish-ochreous, with brown striae; basal patch fuscous-reddish, edge curved; median band dull reddish, dark-striated, edges suffused with dark ochreous-brown, anterior curved, posterior rounded-prominent in middle; a dark ochreous-brown apical streak; termen suffused with greyish. Hindwings pale greyish-ochreous, with grey striae, termen grey.

N. England to the Shetlands, N. Ireland, rather local; N. and mountains of C. Europe, N. America; 6, 7. Larva variable, dull green or brown, black-dotted; incisions pinkish; two conspicuous blotches on 6 and 7, latter larger: on *Senecio vulgaris* (?); 9-4.

12. **X. quadrifasciaria**, *Cl.* 26-28 mm. Forewings light brown, with dark fuscous striae; median band dark brown, blackish-striated, central space sometimes light grey, anterior edge strongly curved near costa, posterior whitish-edged, prominent near costa and rounded-angulated in middle; an oval black discal dot; subterminal line whitish, suffusedly edged with dark brown; cilia distinctly barred. Hindwings fuscous, with pale and darker striae, subterminal line whitish.

Kent to Gloucester and Norfolk, local; N. and C. Europe, N. Asia; 6, 7. Larva dull reddish-brown, with numerous short brown streaks, and several light reddish blotches: on *Galium*; 8-4.

13. **X. firmata**, *Hb.* 25-30 mm. Forewings reddish-ochreous, partially suffused with pale grey; basal patch darker reddish-ochreous, edge dark-marked, angulated above middle; median band suffused with brownish, edges dark fuscous on costa, anterior acutely angulate-indented in middle, posterior angulated above middle; subterminal line pale grey. Hindwings pale ochreous.

Britain to the Hebrides, rather common; C. Europe; 7, 9. Larva dark blue-green; dorsal line darker; subdorsal whitish; subspiracular whitish, posteriorly yellow-tinged; head ferruginous: on *Pinus sylvestris*; 4, 5, 8.

14. **X. montanata**, *Bkh.* 25-29 mm. Head ochreous-white. Forewings ochreous-white, with traces of dark grey striae; basal patch of three curved brown striae mixed with reddish and black; median band ochreous-brown, mixed with white and striated with blackish, anterior edge curved, posterior angulated below costa and in middle; a black discal mark; fifth and

sixth fasciae faintly greyish. Hindwings whitish, with indistinct grey striae; a grey discal dot.

Britain to the Shetlands, Ireland, abundant; N. and C. Europe, N. Asia; 5, 6. Larva whitish-ochreous, on 7-9 brown; dorsal line dark brown, anteriorly with five pairs of blackish spots, on 7-9 forming black spots in pale V-shaped marks; subdorsal brown, interrupted; spiracular pale: on grasses, *Plantago*, *Primula*, etc.; 9-4.

15. X. **fluctuata**, *L.* 22-27 mm. Head dark fuscous, white-mixed. Forewings ochreous-whitish, sometimes grey-sprinkled, with grey striae; basal patch dark fuscous or grey, edge slightly curved; median band obscurely grey, costal half more or less wholly suffused with dark fuscous, anterior edge curved, posterior angulated in middle; a blackish discal mark; a dark fuscous praesubterminal costal spot; fifth and sixth fasciae more or less grey; cilia distinctly barred. Hindwings greyish, with pale and darker striae; a dark grey discal dot.

Britain to the Shetlands, Ireland, very common; Europe, WC. and N. Asia, N. Africa, N. America; 4, 5, 8. Larva dull reddish-ochreous, marked with dark grey; a dorsal series of light patches, with blackish spots on 3-8; two pale lateral stripes; a subspiracular row of five black spots: on cabbage (*Brassica*) and horseradish (*Raphanus*); 6, 9.

16. X. **salicata**, *Hb.* 26-28 mm. Forewings whitish, sprinkled and striated with dark fuscous; edges of median band suffused with fuscous, darker-marked, anterior curved, posterior obtusely angulated near costa and in middle, followed by two clearer white striae; a blackish discal mark; veins towards termen ochreous-tinged; subterminal line white, interrupted. Hindwings grey-whitish, with grey striae on posterior half; a grey discal dot.

Devon, N. England to the Shetlands, Ireland, local; C. and SE. Europe, Asia Minor, Syria; 6, 7. Larva dull brown; subdorsal and lateral lines whitish; spiracular pale pinkish: on *Galium* and *Asperula*; 9-4 (?).

17. X. **olivata**, *Bkh.* 22-28 mm. Forewings olive-green, with indistinct blackish striae; basal patch and median band somewhat darker, edges rather irregular, blackish, whitish-margined, posterior edge of median band with a rounded double projection in middle, followed by two white striae; a blackish discal dot; subterminal line white, interrupted, preceded by blackish spots above middle. Hindwings grey, with pale double postmedian and subterminal lines; a darker discal dot.

Britain to Ross (except EC. England), local; NC. and mountains of C. Europe, NW. Asia; 7, 8. Larva pale ochreous, marked with darker brown; dorsal, subdorsal, and lateral lines dark brown, interrupted on 5-9: on *Galium;* 9-5.

18. **X. viridaria**, *F.* (*pectinataria*, Kn.; *miaria*, Bkh.) 24-28 mm. Forewings green; basal patch and median band darker or brownish towards edges, edges partly black, white-margined, forming triangular black spots on costa, and sometimes thickened on dorsum, anterior edge of median band twice angulated, posterior with short bidentate median projection; a darker discal mark; subterminal line whitish; a blackish apical streak. Hindwings grey, with pale double postmedian and subterminal lines.

Britain to the Orkneys, Ireland, very common; N. and C. Europe, NW. Asia; 5, 6. Larva rather stout, reddish-ochreous, marked with dark fuscous; dorsal line dark, interrupted; a series of five light V-shaped marks: on *Galium;* 8-4.

23. RHODOMETRA, *Meyr.*

Face forming an obtuse prominence. Antennae in ♂ bipectinated, apex simple. Palpi loosely scaled. Forewings: areole simple. Hindwings: 8 anastomosing with cell to beyond middle.

A small European and African genus.

1. **R. sacraria**, *L.* 22-24 mm. Forewings pale yellow, sometimes rosy-tinged; costa rosy-purple towards base; a straight purple or brown-reddish streak from costa before apex to dorsum at ⅔. Hindwings yellow-whitish.

England to Lancashire, Perth, a casual immigrant only; S. Europe, SW. Asia to N. India, Africa; 7, 8. Larva green; dorsal line pale, edged with ferruginous lines, after 5 forming V-shaped marks enclosing yellow-white spots; spiracular yellowish-green on 2-4 and 11-13; spiracles reddish; head pale brownish-red; prolegs pink: on *Rumex*, *Anthemis*, etc.; 9-5.

24. LYTHRIA, *Hb.*

Face rough-haired or loosely scaled. Antennae in ♂ bipectinated, apex sometimes simple. Palpi with long rough hairs. Thorax roughly hairy beneath. Forewings: areole simple. Hindwings: 8 anastomosing with cell to beyond middle.

A small genus, occurring in Europe and New Zealand.

1. **L. purpuraria**, *L.* 22-26 mm. Forewings olive-brown or

fulvous; costa sometimes mixed with purple; two purple or crimson fasciae, variable in width, first curved, not reaching dorsum, second straight, sometimes furcate on costa, sometimes not reaching dorsum; cilia purple or crimson. Hindwings deep orange: base and dorsum suffused with fulvous or olive-brownish; cilia of termen purple.

York, two specimens many years ago, probably not a resident; Europe, WC. Asia to Turkestan; 6. Larva slender, dull green or brown-reddish, beneath pale green, division well-marked; dorsal line darker: on *Rumex* and *Polygonum;* 8.

2. STERRHIDAE.

Face smooth. Tongue developed. Palpi shortly rough-scaled. Forewings: 10 rising out of 9, 11 anastomosing or connected with 9. Hindwings: 5 fully developed, rising from middle of transverse vein, parallel to 4, 8 very shortly anastomosing with upper margin of cell near base, thence rapidly diverging.

Though not as numerous as the preceding, this is still a very considerable family, pretty evenly distributed throughout the world except in New Zealand, where there is only one hardly native species. Imago usually of rather small size, body slender, forewings rather broad-triangular; posterior tibiae of ♂ often enlarged and enclosing an expansible tuft of hairs.

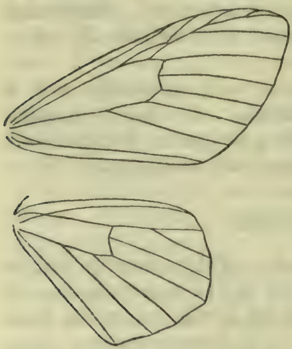
Ovum oblong-oval, surface reticulated. Larva elongate, slender, with few hairs, without prolegs on 7-9. Pupa usually in a very slight cocoon above ground.

The phylogeny of the few British genera is almost sufficiently indicated by their linear arrangement.

Tabulation of Genera.

1. Posterior tibiae in ♀ with middle-spurs absent . 2.
„ „ „ middle-spurs present . 3.
2. Posterior tibiae in ♂ with end-spurs . 2. Sterrha.
„ „ „ wholly without spurs 1. Eois.
3. Posterior tibiae in ♂ wholly without spurs 3. Leptomeris.
„ „ „ with at least end-spurs . 4.
4. Posterior tibiae in ♂ with middle-spurs
6. Calothysanis.
„ „ „ without middle-spurs . 5.
5. Antennae in ♂ pectinated . 5. Leucophthalmia.
„ „ ciliated . . . 4. Pylarge.

1. Eois, *Hb.*



Neuration of *Eois aversata.*

Antennae in ♂ ciliated with fascicles or evenly, rarely (*perochraria*) with fascicles rising from very short paired processes. Posterior tibiae in ♂ without spurs, in ♀ with end-spurs only. Hindwings: 6 and 7 stalked, or rarely separate.

A large and generally distributed group, but most numerous in the European region; derived from *Leptomeris.* Larva thickest on 9 or 10, tapering forwards, transversely wrinkled, head more or less bifid; probably feeding on various low plants indiscriminately, but most are only known by breeding from the eggs of captured moths.

1. Termen of forewings with angular projection 14. *emarginata.*
,, ,, not angular . . . 2.
2. Wings purple and yellow . . 1. *muricata.*
,, not purple and yellow . . . 3.
3. Wings deep yellow-ochreous . . 6. *perochraria.*
,, not deep yellow-ochreous . . . 4.
4. Forewings without discal dot . . 7. *holosericata.*
,, with discal dot . . . 5.
5. Discal dot of forewings before median line . 6.
,, ,, on or beyond median line 12.
6. Wings blackish-sprinkled . . . 7.
,, not blackish-sprinkled . . . 11.
7. Praesubterminal line thickened . . 17. *bisetata.*
,, ,, not thickened . . 8.
8. Second line black-dotted . . . 4. *virgularia.*
,, not black-dotted . . . 9.
9. Discal dot of hindwings before median line 5. *straminata.*
,, ,, beyond median line . 10.
10. Cilial dots blackish . . . 12. *aversata.*
,, faint or absent . . 11. *inornata.*
11. Antemedian band reddish-grey . 13. *degeneraria.*
,, ,, not reddish-grey 10. *subsericeata.*
12. Forewings with fuscous postmedian band 3. *rusticata.*
,, without such band . . . 13.

13. Forewings with praesubterminal line black-marked on lower half 15. *dimidiata.*
„ „ „ not black-marked 14.
14. Praesubterminal line thickened . . . 15.
„ „ not thickened . . 16.
15. Wings blackish-sprinkled . . 2. *contiguaria.*
„ not blackish-sprinkled . 16. *trigeminata.*
16. Forewings with dull red costal streak . 9. *humiliata.*
„ without red costal streak . 8. *dilutaria.*

1. **E. muricata,** *Hufn.* (*auroraria,* Bkh.) 17-18 mm. Head dark fuscous, fillet white, collar purple. Antennae in ♂ dentate, cilia 1½. Posterior tarsi in ♂ 1¼. Forewings purple, much sprinkled with dark grey along costa; a discal and two cloudy dorsal blotches yellow; second line blackish-grey, subsinuate; an irregular terminal fascia and cilia yellow. Hindwings as forewings, but partly sprinkled with pale yellowish, without dorsal blotches or grey costal scales.

England, S. and W. Ireland, local; C. Europe, N. Asia, Japan; 6, 7. Larva brownish-grey; dorsal line double, blackish, widened from 5 to 9 and on incisions; subdorsal interrupted except towards extremities; subspiracular dark dots and oblique streaks: on *Plantago lanceolata;* 8-5.

[*E. herbariata,* F., a species of 16 mm., with whitish-ochreous fuscous-sprinkled ground and fuscous lines, first and median confluent to form a band, is said to have occurred in London; but if authentic, it was doubtless an accidental importation. The species inhabits SC. and S. Europe.]

2. **E. contiguaria,** *Hb.* 18-19 mm. Head blackish, fillet white, collar ochreous-whitish. Antennae in ♂ dentate, cilia 1½. Posterior tarsi in ♂ ⅔. Forewings pale whitish-ochreous sprinkled with blackish; first, median, and second lines indistinct, irregular, grey, forming dark grey spots on costa; margins of subterminal grey, anterior thick, twice interrupted; a black discal dot beyond median. Hindwings as forewings, but first line absent, no costal spots.

NW. Wales, local; WC. Europe; 6, 7. Larva rough, whitish-ochreous; lines dark brown, dorsal traversing oval spots formed by dark brown lines on 5-9; subdorsal double; subspiracular irregular: on *Erica* and *Empetrum;* 8-5.

3. **E. rusticata,** *F.* 17-19 mm. Head dark fuscous, crown in ♀ whitish-fuscous. Antennae in ♂ filiform, cilia 1. Posterior tarsi in ♂ 1½. Forewings whitish; a rather dark fuscous basal patch indicating first line; median and second sinuate, dark

fuscous, enclosed band fuscous; margins of subterminal pale brownish-ochreous, anterior rather thick, waved; a blackish discal dot in central band. Hindwings as forewings, but no basal patch or central band, median and second lines light fuscous.

Sussex to Suffolk, Dorset, local; WC. and S. Europe; 7. Larva pale greyish-ochreous; dorsal area with dark brown lines crossing one another, on 6-9 forming diamonds enclosing dark crosses; lateral series of dark brown marks; head dark brown: on *Polygonum aviculare* (?); 8-5.

4. **E. virgularia**, *Hb.* (*incanaria*, Hb) 17-19 mm. Head black, fillet white, collar grey. Antennae in ♂ subdentate, cilia $1\frac{1}{2}$. Posterior tarsi in ♂ $\frac{3}{5}$. Forewings pale greyish-ochreous, much sprinkled with blackish; first line, median, second, and margins of subterminal grey, subsinuate, second dotted with black; a black discal dot before median. Hindwings as forewings, but first line absent, discal dot beyond median.

Britain to Kincardine, Ireland, common (scarce in Scotland); C. and S. Europe, Asia Minor, Syria, N. Africa, becoming more whitish southwards; 6-8. Larva brownish-grey or ochreous-brown; dorsal and subdorsal lines pale ashy or ochreous, on 5-9 indistinct; sides streaked with dark brown; 5-9 with pairs of brown dorsal anterior leaf-shaped and posterior double V-shaped marks; head bifid, brown: on *Polygonum aviculare* (?); 8-5.

5. **E. straminata**, *Tr.* (*marginepunctata*, Stph.; *circellata*, Gn.) 18-19 mm. Head black, fillet white, collar whitish-ochreous. Antennae in ♂ subdentate, cilia $1\frac{1}{4}$. Posterior tarsi in ♂ $\frac{1}{2}$. Forewings pale greyish-ochreous, sprinkled with black, first line, median, second, and margins of subterminal darker, subsinuate; a black discal dot before median; terminal black dots well-marked. Hindwings as forewings, but first line absent.

Kent to Devon, Bucks, Cheshire to York, local; C. Europe, WC. Asia to Turkestan; 6-7. Larva pale ashy-grey; dorsal line pale, edged with black lines, stronger, interrupted, and doubled on 5-10, sometimes confused; subdorsal pale, indistinct; head grey, marked with dark brown: on *Polygonum aviculare* (?); 8-5. The scarce local form called *circellata* is less ochreous-tinged, the lines greyer, first and second sometimes very strongly marked; it seems to replace the ordinary form in Cheshire and Lancashire.

6. **E. perochraria**, *F.R.* 16-20 mm. Head brownish-ochreous,

face dark fuscous. Antennal cilia of ♂ from short paired processes. Posterior tarsi in ♂ 1. Forewings deep yellow-ochreous dusted with black along costa; first line, median, second, and margins of subterminal ferruginous-ochreous, in ♀ more fuscous, subsinuate; sometimes a dark fuscous discal dot on median. Hindwings as forewings, but first line absent, discal dot beyond median.

Surrey, local; N. and C. Europe, N. Asia; 6, 7.

7. **E. holosericata**, *Dup.* 18-20 mm. Head dark fuscous, fillet ochreous-white, collar pale ochreous. Antennae in ♂ filiform, cilia 1. Posterior tarsi in ♂ almost 1. Forewings whitish-ochreous, along costa much sprinkled with dark fuscous; first line, median, second, and margins of subterminal light fuscous, subsinuate. Hindwings as forewings, but costa not dark-sprinkled, first line absent, a blackish discal dot beyond median.

S. England to Pembroke and Norfolk, local; C. Europe, Asia Minor; 7. Larva dull reddish-brown; dorsal line paler, edged with black lines: on *Polygonum aviculare* (?); 8-5.

8. **E. dilutaria**, *Hb.* (*interjectaria*, B.; *osseata*, Stt.) 17-20 mm. Head dark fuscous, fillet ochreous-white, collar pale ochreous. Antennae in ♂ filiform, cilia 1. Posterior tarsi in ♂ 1. Forewings whitish-ochreous, along costa sprinkled with dark fuscous and brownish-tinged towards base; first line, median, second, and margins of subterminal pale fuscous, subsinuate, darker on costa; short black terminal marks; a black discal dot beyond median. Hindwings as forewings, but without darker costal colouring, first line absent.

England to York, local; C. Europe, N. Asia; 6, 7. Larva grey-brown, ochreous-marked; dorsal line pale ochreous, dark-edged, interrupted by white spots on incisions 6-8; lateral ridge ochreous; head ochreous-marked: on *Taraxacum*, *Anagallis*, etc.; 8-5.

9. **E. humiliata**, *Hufn.* (*osseata*, F.) 17-20 mm. Differs from *E. dilutaria* as follows: wings darker, slightly black-sprinkled, terminal line dark grey, almost entire, forewings with a dull red costal streak.

I. of Wight, local; Europe, Asia Minor, N. Africa; 6, 7.

10. **E. subsericeata**, *Hw.* (*mancuniata*, Knaggs) 21-23 mm. Head blackish, fillet white, collar pale ochreous. Antennae in ♂ subdentate, cilia 1¼. Posterior tarsi in ♂ ½. Forewings ochreous-white, sprinkled with pale grey; first line, median, second, and margins of subterminal light ochreous-grey regular;

a faint blackish discal dot before median. Hindwings as forewings, but first line absent, discal dot beyond median or absent.

England to Westmoreland, E. Ireland, local; WC. and S. Europe, WC. Asia to N. Persia; 6. Larva pale ochreous, brown-marked; dorsal line pale, brown-edged; subdorsal dark brown, on 6-9 broken into oblique streaks almost meeting on back posteriorly; lateral ridge ochreous; a conspicuous pale lateral spot on 10: on *Taraxacum*, *Polygonum*, etc.; 7-5.

11. **E. inornata**, *Hw.* 26-30 mm. Head blackish, fillet white, collar pale ochreous. Antennae in ♂ filiform, cilia 1. Posterior tarsi in ♂ ⅓. Forewings pale ochreous, dusted with black; lines subsinuate; first and second grey; median and margins of subterminal faintly darker ochreous; a black discal dot before median; cilial dots faint or absent. Hindwings as forewings, but first line absent, discal dot beyond median.

England to Westmoreland, E. and S. Ireland, local; C. and S. Europe, Asia Minor; 6, 7. Larva purple-brown or dull brown; dorsal line pale, indistinct; on 5-8 a dark fuscous X-shaped dorsal mark, on 9 a Y-shaped mark extended to 13: on *Rumex acetosella*, *Polygonum*, etc.; 8-5.

12. **E. aversata**, *L.* 27-30 mm. Head blackish, fillet white, collar pale ochreous. Antennae in ♂ filiform, cilia 1. Posterior tarsi in ♂ ⅓. Forewings pale ochreous, much sprinkled with blackish; lines subsinuate; first, median, and second dark grey, postmedian band sometimes grey; margins of subterminal faint, ochreous-grey; a black discal dot before median; terminal line and cilial dots blackish. Hindwings as forewings, but first line absent, discal dot close beyond median.

Britain to Ross, Ireland, common; Europe, Asia Minor; 6, 7. Larva dark brown, 9-13 reddish-ochreous; dorsal line pale, dark-edged; an ochreous-whitish dorsal spot on 9, containing a reddish-brown V-shaped mark; short lateral whitish streaks on 6-9; head brown, with two reddish-ochreous stripes: on *Geum*, *Myosotis*, etc.; 8-5.

13. **E. degeneraria**, *Hb.* 23-27 mm. Head dark reddish-fuscous, fillet white, collar ochreous. Antennae in ♂ filiform, cilia 1. Posterior tarsi in ♂ ¼. Forewings light greyish-ochreous, costa narrowly reddish-ochreous; lines angularly sinuate; first and median fuscous, enclosed band reddish-grey, sometimes basal area also; second faint, near costa fuscous; margins of subterminal very faint; a black discal dot before median; terminal line blackish. Hindwings as forewings, but first line absent, discal dot beyond median.

Dorset (Portland), very local; SC. and S. Europe, WC. Asia to Turkestan, more reddish-ochreous southwards; 6, 7. Larva ferruginous, 5-8 dark brown; dorsal and subdorsal lines pale greyish-ochreous, interrupted; 5-9 with darker dorsal spots and double V-shaped marks; head black-brown, ferruginous-marked: on *Rubus*, *Polygonum*, etc. (?); 8-5.

14. **E. emarginata**, *L.* 21-22 mm. Head dark reddish-fuscous, fillet white, collar whitish-ochreous. Antennae in ♂ subdentate, cilia 1. Posterior tarsi in ♂ $\frac{3}{5}$. Forewings light reddish-ochreous; first and second lines fine, curved, dark fuscous; median broad, fuscous, sometimes faint; a black discal dot on median; termen projecting in middle, concave above. Hindwings as forewings, but first line absent.

England to York, local; Europe, N. Asia; 6, 7. Larva light greyish-ochreous; dorsal line pale, brown-edged, more strongly on 10-13; 6-9 with black dorsal X-shaped marks; some lateral brown marks, ridge pale: on *Galium*, *Convolvulus*, etc.; 8-5.

15. **E. dimidiata**, *Hufn.* (*scutulata*, Bkh.) 16-19 mm. Head black, fillet white, collar whitish-ochreous. Antennae in ♂ dentate, cilia $1\frac{2}{3}$. Posterior tarsi in ♂ almost 1. Forewings ochreous-whitish, sprinkled with blackish; first and second lines curved, grey, partly black-marked; median cloudy, grey; margins of subterminal waved, grey, anterior blackish-marked on lower half; a black discal dot on median. Hindwings as forewings, but first line absent, discal dot beyond median, praesubterminal not black-marked.

Britain to the Clyde, Ireland, common (unfrequent in Scotland); C. Europe, WC. Asia to N. Persia; 6, 7. Larva reddish-ochreous; dorsal line pale, brown-edged, stronger posteriorly; 5-9 with pairs of oblique brown streaks; lateral ridge pale: on *Galium*, *Pimpinella*, etc.; 8-5.

16. **E. trigeminata**, *Hw.* 21-22 mm. Head blackish, fillet white, collar light ochreous. Antennae in ♂ filiform, cilia $1\frac{1}{4}$. Posterior tarsi in ♂ $\frac{1}{2}$, tibial tuft large. Forewings pale whitish-ochreous; basal $\frac{1}{3}$ of costa fuscous; first and median lines faint, irregular, on costa fuscous; second line and thick interrupted praesubterminal dark fuscous, waved, postsubterminal faint; a black discal dot beyond median. Hindwings as forewings, but lines fainter, first absent, costa not dark-marked.

Britain to the Clyde, local; C. Europe, W. and N. Asia; 6, 7. Larva deep brown; dorsal line faint, pale, black-edged near incisions, with blackish V-shaped dorsal marks. ceasing beyond

9; subdorsal blackish, interrupted; spiracular pale ochreous; a whitish dorsal spot on 10: on *Polygonum aviculare* (?); 8-5.

17. **E. bisetata**, *Hufn.* 19-22 mm. Head blackish, fillet white, collar whitish-ochreous. Antennae in ♂ filiform, cilia 1. Posterior tarsi in ♂ ½, rough-scaled, tibial tuft large. Forewings whitish-ochreous, more or less sprinkled with dark fuscous; first and median lines grey, irregular, second dark grey, waved, margins of subterminal grey, anterior rather thick, irregular; a black discal dot before median. Hindwings as forewings, but first line absent, discal dot beyond median.

Britain to Ross, Ireland, common; C. Europe, W. and N. Asia; 6, 7. Larva brown, 9-13 ochreous; 5-9 with dark brown dorsal V-shaped mark; dorsal line pale, edged with dark brown, more strongly on 10-13: on *Taraxacum*, *Cardamine*, etc.; 8-5.

2. STERRHA, *Hb.*

Antennae in ♂ serrate, ciliated with fascicles. Posterior tibiae in ♂ slender, in ♂ and ♀ with end-spurs only. Hindwings: 6 and 7 stalked.

A genus of moderate size, at present not recognised outside the European region; only one species reaches Britain.

1. **S. ochrata**, *Sc.* 19-21 mm. Head ochreous, face fuscous. Forewings rather deep ochreous; lines regular, first, median, and margins of subterminal darker, second fuscous. Hindwings as forewings, but first line absent, second more sinuate; termen rounded.

Kent, Surrey, Essex, local; C. and S. Europe, WC. Asia to Turkestan; 6.

3. LEPTOMERIS, *Hb.*

Antennae in ♂ ciliated with fascicles. Posterior tibiae in ♂ dilated, without spurs, in ♀ with all spurs present. Hindwings: 6 and 7 sometimes stalked (variable in the same species).

A large genus of almost universal distribution. Larva more uniformly cylindrical and slender than in *Eois*, head rounder.

1. Face mixed throughout with white . 9. *immorata.*
  ,, wholly black or dark fuscous . . 2.
2. Wings ochreous or reddish . . . 3.
  ,, white or whitish-ochreous . . . 4.
3. Termen of hindwings angulated . . 5. *imitaria.*
  ,, ,, rounded . . 10. *rubiginata.*
4. Discal dot of hindwings before median line 8. *strigaria.*
  ,, ,, ,, on or beyond median line 5.

5. Subterminal line preceded by two ochreous blotches 4. *ornata.*
,, ,, not preceded by ochreous blotches 6.
6. Second line black-dotted; posterior tarsi of ♂ 1 . 7.
,, ,, not black-dotted; posterior tarsi of ♂ $\frac{2}{5}$-$\frac{3}{5}$ . . . . . 8.
7. Termen of hindwings angulated . . 6. *emutaria.*
,, ,, rounded . 3. *marginepunctata.*
8. Discal dot of forewings black, distinct . . 9.
,, ,, ,, pale fuscous or absent 1. *remutaria.*
9. Second line grey . . . . 7. *strigilaria.*
,, ,, pale ochreous . . 2. *immutata.*

1. **L. remutaria**, *Hb.* 26-30 mm. Head blackish, fillet white, collar pale ochreous. Posterior tarsi in ♂ $\frac{2}{5}$. Forewings ochreous-whitish, dusted with black; lines subsinuate, first, median, and margins of subterminal pale greyish-ochreous, second pale fuscous, waved; sometimes a pale fuscous discal dot before median. Hindwings as forewings, but first line absent, discal dot black, beyond median, second sinuate; termen obtusely angulated.

Britain to Caledonian Canal, E. and S. Ireland, common; N. and C. Europe; 5, 6. Larva greyish-brown, irregularly darker-marked; a dark dorsal cross on 10; dorsal line faint, pale, incomplete: on *Asperula*, birch, etc.; 7-4.

2. **L. immutata**, *L.* 22-25 mm. Head blackish, fillet white, collar pale ochreous. Posterior tarsi in ♂ $\frac{3}{5}$. Forewings ochreous-white, dusted with black; lines regular, first, median, second, and margins of subterminal pale ochreous, second subsinuate, slightly waved; a black discal dot before median. Hindwings as forewings, but first line absent, discal dot beyond median; termen very obtusely angulated.

England, S. Ireland, local; N. and C. Europe, N. Asia; 6, 7. Larva pale dull brownish-ochreous, pink-tinged above; dorsal line pale, dark-edged, more strongly posteriorly; subdorsal grey; spiracular pale; pairs of black dorsal spots on incisions from 5 to 10: on *Malva*, *Polygonum*, etc. (?); 8-5.

3. **L. marginepunctata**, *Gz.* (*incanata*, Hw.; *promutata*, Gn.) 23-26 mm. Head blackish, fillet ochreous-white. Posterior tarsi in ♂ almost 1. Forewings pale whitish-ochreous, much sprinkled with black; lines sinuate, first and second grey, dotted with black, median grey, praesubterminal broad, grey, waved, postsubterminal pale grey; a black discal dot before

median. Hindwings as forewings, but first line absent, discal dot beyond median; termen rounded.

Britain to the Clyde, E. and S. Ireland, local; C. and S. Europe, WC. Asia; 6, 7. Larva pale greyish-ochreous; dorsal line paler, dark-edged, more strongly on 11-13; subdorsal pale yellowish: on *Achillea*, *Polygonum*, etc.; 8-5.

4. **L. ornata,** *Sc.* 21-24 mm. Head blackish, fillet white, collar pale ochreous. Posterior tarsi in ♂ almost 1. Forewings white; lines sinuate; first faint, sometimes black-dotted; median faint ochreous; second fine, waved, ochreous, partly black; margins of subterminal thick, grey, anterior forming ochreous blotches above middle and tornus; a grey discal dot before median. Hindwings as forewings, but first line absent, discal dot black, beyond median; termen waved, obtusely angulated.

S. England to Gloucester and Suffolk, local; C. and S. Europe, WC. Asia to Turkestan, N. Africa; 6, 8. Larva brownish-ochreous; dorsal line pale, dark-edged; subdorsal dark brown; spiracular pale, dark-edged beneath; 5-9 with obtuse dorsal diamonds outlined with dark brown: on *Thymus* and *Origanum;* 8-4.

5. **L. imitaria,** *Hb.* 24-27 mm. Head blackish; fillet reddish-white, collar light ochreous. Posterior tarsi in ♂ almost 1. Forewings reddish-ochreous; first line grey, angulated; median dark grey, straight, oblique, followed by a cloudy shade; second subsinuate, dark grey; a black discal dot before median. Hindwings as forewings, but first line absent, discal dot larger, beyond median; termen angulated.

England, S. Ireland, rather common; W. and S. Europe, WC. Asia; 7, 8. Larva dull ochreous; dorsal line brown, darker posteriorly; subdorsal and lateral faint, pale; 5-9 with dark lateral blotches, sometimes indistinct: on *Taraxacum*, *Rumex*, etc.; 9-6.

6. **L. emutaria,** *Hb.* 21-24 mm. Head blackish, fillet white, collar brownish. Posterior tarsi in ♂ almost 1. Forewings ochreous-whitish, sometimes pink-tinged, much sprinkled with black; lines nearly straight, obsolete towards costa; first and second fine, grey, blackish-dotted; median thick, purplish-grey, oblique; margins of subterminal purplish-grey; a black discal dot before median. Hindwings as forewings, but first line absent, discal dot on median; termen angulated.

SE. England to Dorset and Norfolk, local; S. Europe, N. Africa (a doubtfully distinct form ranges in WC. Asia to

Turkestan); 6. Larva pale dull brownish-ochreous; dorsal line pale, edged with dark brown; subdorsal blackish, pale-edged above; some irregular lateral streaks; spiracular dull brown: on *Polygonum aviculare* (?); 8-5.

7. **L. strigilaria**, *Hb.* (*prataria*, Boisd.) 26-28 mm. Head blackish, fillet white, collar whitish-ochreous. Posterior tarsi in ♂ $\frac{2}{5}$. Forewings whitish-ochreous, much sprinkled with black; lines subsinuate; first, median, and margins of subterminal ochreous; second grey, waved; a black discal dot before median. Hindwings as forewings, but first line absent, discal dot beyond median; termen angulated.

Kent, Sussex, Cumberland, scarce; C. Europe, N. Asia; 6, 7. Larva ochreous or greyish; dorsal line pale, brown-edged; 5 with three, 6-9 with four, 10 with two black oblong dorsal spots; spiracular line pale, brown-edged beneath; head paler: on *Cytisus*, *Erica*, etc.; 8-5.

8. **L. strigaria**, *Hb.* 20-21 mm. Head blackish, fillet white, collar whitish-ochreous. Posterior tarsi in ♂ almost 1. Forewings whitish-ochreous, much sprinkled with black; first line, median, second, and margins of subterminal greyish-ochreous, regular. Hindwings as forewings, but first line absent; a black discal dot before median; termen rounded or somewhat bent.

Kent, Sussex, scarce; C. and S. Europe, Asia Minor; 6.

9. **L. immorata**, *L.* 23-26 mm. Head blackish, mixed with ochreous-white. Posterior tarsi in ♂ 1. Forewings whitish, densely sprinkled with black throughout, towards base suffused with ochreous; first, median, and second lines thick, sinuate, ochreous, first and median subconfluent; subterminal clear, white, dentate, margins broad, ochreous. Hindwings as forewings, but first line absent; sometimes a black discal dot beyond median; termen rounded.

Sussex, very local; N. and C. Europe, N. Asia; 6, 7.

10. **L. rubiginata**, *Hufn.* (*rubricata*, F.) 18-21 mm. Face dark fuscous, crown pale ochreous or reddish-grey. Posterior tarsi in ♂ 1¼. Forewings ochreous-reddish, light crimson, or pale reddish-ochreous; postmedian band often paler; first, median, and second lines grey, regular, first bent; margins of subterminal faintly darker or greyish. Hindwings as forewings, but first line absent; sometimes a minute grey discal dot beyond median; termen rounded.

Sussex to Norfolk, N. England, local; Europe, WC. and N. Asia; 6, 7. Larva greyish-brown; dorsal line pale, reddish-edged; subdorsal anteriorly broad, blackish, afterwards forming spots on incisions; lateral ridge pale; head darker-marked: on *Lotus*, *Polygonum*, etc. (?); 8-5.

4. PYLARGE, *HS.*

Antennae in ♂ ciliated with fascicles. Posterior tibiae in ♂ not dilated, with end-spurs only, in ♀ with all spurs present. Hindwings: 6 and 7 sometimes stalked.

A very small genus, but ranging to Australia. Larva as in *Leptomeris.*

1. **P. fumata**, *Stph.* 23-26 mm. Head blackish, fillet and collar ochreous-white. Forewings pale whitish-ochreous, much sprinkled with black; first line, median, second, and margins of subterminal pale ochreous or greyish-ochreous, regular. Hindwings as forewings, but lines subsinuate, first absent; termen very obtusely angulated.

Britain to Sutherland, Ireland, common (scarce in S. England); N. and mountains of C. Europe, N. Asia; 6. Larva pale brown; dorsal line pale, brown-edged, darker on incisions; subdorsal pale; lateral ridge pale, brown-edged beneath; black subspiracular dots on 2, 5, 6: on *Erica* and *Vaccinium;* 8-5.

5. LEUCOPHTHALMIA, *Hb.*

Antennae in ♂ bipectinated, towards apex simple. Posterior tibiae in ♂ slender, with end-spurs only, in ♀ with all spurs present. Hindwings: 6 and 7 stalked.

A small characteristically European genus, reaching North America. Pupa truncate anteriorly, exposed, attached to a leaf by the tail and sometimes a median girdle.

1.	Second line black-dotted	2.
	„ „ dentate, not dotted . .	6. *annulata.*
2.	Discal dot absent . . .	4. *punctaria.*
	„ „ present	3.
3.	Median line dentate . . .	1. *orbicularia.*
	„ „ not dentate	4.
4.	Median line dark grey, sharp . .	5. *trilinearia.*
	„ „ cloudy or faint	5.
5.	Ground-colour whitish . . .	2. *pendularia.*
	„ pale ochreous . . .	3. *porata.*

1. **L. orbicularia**, *Hb.* 24-26 mm. Face dark fuscous, crown white, blackish-sprinkled. Forewings grey-whitish, strigulated with dull reddish and sprinkled with blackish; first and second lines irregular, formed by black dots; median grey-reddish,

dentate, sinuate; praesubterminal partially grey-reddish; a white reddish-circled discal dot before median. Hindwings as forewings, but subterminal line not indicated.

S. England to Worcester and Cambridge, E. Ireland, local; C. Europe; 5, 6. Larva pale pinkish-ochreous or green; dorsal and subdorsal lines pale; 5-9 with oblique pale purplish streaks; head yellowish, brown-speckled: on *Salix caprea;* 8, 9.

2. **L. pendularia,** *Cl.* 22-25 mm. Face reddish-fuscous, crown whitish. Forewings whitish, faintly strigulated with reddish-grey and sprinkled with blackish; first and second lines subsinuate, pale grey, black-dotted; median grey, cloudy or faint; praesubterminal grey, interrupted; a white red-grey-circled discal mark before median. Hindwings as forewings, but discal mark blackish-circled, in median, subterminal faint.

Britain to Ross, rather common; N. and C. Europe, N. Asia; 5, 6. Larva green or purplish; dorsal line pale, dark-edged; subdorsal pale or yellowish; 5-9 with ferruginous lateral marks; head ferruginous or dark brown: on birch; 7, 8.

3. **L. porata,** *F.* 23-26 mm. Face reddish-ochreous, crown whitish-ochreous. Forewings pale ochreous, strigulated with grey, disc reddish-ochreous, strigulated with reddish; first and second lines subsinuate, formed by blackish dots; median grey-reddish, cloudy or faint; praesubterminal grey, interrupted; a white blackish-circled discal dot before median. Hindwings as forewings, but discal dot larger, on median.

Britain to the Clyde, rather common; C. and S. Europe, Asia Minor; 5, 6, 8. Larva green or flesh-colour; head reddish-brown: on oak and birch; 6, 7, 9.

4. **L. punctaria,** *L.* 23-29 mm. Face brown-reddish, crown ochreous-whitish. Forewings pale ochreous, strigulated with reddish-ochreous and grey, sprinkled with black; first and second lines curved, formed by black dots; median dark grey. Hindwings as forewings.

Britain to Caledonian Canal, E. Ireland, common; C. and S. Europe, WC. Asia to N. Persia; 5, 6, 8. Larva green, ochreous, or flesh-colour; dorsal pale, dark-edged; 5-10 with oblique brown-red, dark grey, or blackish yellow-edged streaks; head brown: on oak and birch; 7, 9.

5. **L. trilinearia,** *Bkh.* (*linearia,* Hb.) 24-29 mm. Face brown-red, crown pale ochreous. Forewings reddish-ochreous, dusted with black; first and second lines curved, grey, black-dotted; median dark reddish-grey; a whitish discal dot before

median. Hindwings as forewings, but discal dot sometimes grey-circled.

England to York, common; C. Europe; 5, 6. Larva reddish-brown, with yellow markings: on beech; 8, 9.

6. **L. annulata**, *Schulze* (*omicronaria*, Hb.) 20-23 mm. Head ochreous-white, upper part of face ochreous-fuscous. Forewings yellow-whitish, posteriorly suffused with ochreous-yellowish; first and second lines irregularly dentate, blackish; median dentate, dark grey, suffused into second; praesubterminal grey, indistinct; a black discal ring before median. Hindwings as forewings, but discal ring touching median line, which is obsolete above it.

England, rather common; C. Europe, Asia Minor; 5, 6. Larva green; dorsal and subdorsal lines yellow; incisions yellowish; head reddish-brown: on maple; 7, 8.

6. CALOTHYSANIS, *Hb.*

Antennae in ♂ bipectinated, towards apex simple. Posterior tibiae in ♂ and ♀ with all spurs present. Hindwings: 6 and 7 stalked.

A rather small Indo-Malayan genus, of which the single strictly European species is a straggler.

1. **C. amata**, *L.* (*amataria*, L.) 27-31 mm. Face dark crimson-fuscous, fillet white, collar brownish-ochreous. Forewings whitish-ochreous, much sprinkled with grey; first line faint; median dark red, straight, running to apex; second grey, sinuate, confluent above with median; a grey linear discal dot; a deep crimson terminal line. Hindwings as forewings, but first line and discal dot absent, median to middle of costa, second to before apex; termen caudate-angulated.

Britain to Caledonian Canal, S. Ireland, common (scarce in Scotland); Europe, WC. and N. Asia; 6, 7. Larva brownish-grey; dorsal and subdorsal lines whitish; 6-9 with double dorsal fuscous spot; head brown: on *Rumex*, etc.; 8-5.

3. GEOMETRIDAE.

Face smooth. Tongue developed. Forewings: 10 rising out of 9. Hindwings: 5 fully developed, approximated to 6 towards base, rising much above middle of transverse vein, 8 shortly anastomosing or connected with or appressed to upper margin of cell near base, thence rapidly diverging or sometimes approximated to near middle.

This is also an extensive family, though principally inhabiting the Indo-Malayan, African, and Australian regions; few species occur in Europe or America, and none in New Zealand. Excepting some of the earliest genera, these insects are remarkable for their clear green colour, which is comparatively rare in the *Lepidoptera*, but here so constant as to be almost of systematic value. This colouring is no doubt protective, and the habits of the imagos are in accordance with it, as they are usually strictly nocturnal in their flight. The origin of the family may be unhesitatingly referred to *Sarcinodes*, an Indo-Malayan genus of *Monocteniadae*. Imago with body moderate or slender, forewings broad-triangular; posterior tibiae of ♂ sometimes enclosing an expansible tuft of hairs.

Ovum, larva, and pupa much as in the *Sterrhidae*, but larva sometimes stouter.

The phylogeny is nearly expressed by the order.

TABULATION OF GENERA.

1.	Posterior tibiae in ♂ without middle-spurs	1. NEMORIA.
	,, ,, with middle-spurs .	. 2.
2.	Antennae in ♂ bipectinated to apex	. 3. GEOMETRA.
	,, ,, with apex simple	. . 3.
3.	Hindwings with 6 and 7 stalked .	. 2. EUCHLORIS.
	,, ,, 6 and 7 separate	4. PSEUDOTERPNA.

1. NEMORIA, *Hb.*

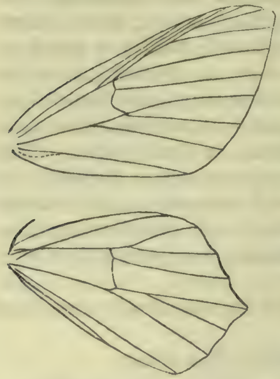
Antennae in ♂ ciliated. Palpi shortly rough-scaled. Posterior tibiae in ♂ with end-spurs only, tarsi short. Forewings: 10 out of 9, 11 sometimes anastomosing with 12. Hindwings. 3 and 4 sometimes stalked, 6 and 7 stalked, 8 very shortly anastomosing with cell near base, thence rapidly diverging.

A genus of limited extent but wide distribution. Larva transversely wrinkled, head and 2 bicuspidate.

Cilia barred with darker . . .	1. *strigata.*
,, not barred	2. *viridata.*

1. **N. strigata**, *Müll.* (*thymiaria*, Gn.) 27-31 mm. Face red-brown, fillet white, crown light green. Antennae in ♂ strongly dentate. Forewings dull green; first and second lines sinuate, whitish; cilia whitish, barred with dark grey. Hindwings as forewings, but first line absent, a darker discal mark; termen subcaudate-angulated.

England, Forfar, W. Ireland, common; C. and S. Europe, Asia Minor; 6, 7. Larva brown, 5-10 sometimes yellowish or flesh-colour; 2-5 suffused with pale purplish, with brown dorsal, subdorsal, and spiracular lines; 6-9 with pale purplish or whitish V-shaped marks; head brown: on birch, blackthorn, etc.; 8-5.



Neuration of *Nemoria strigata.*

2. **N. viridata**, *L.* 22-24 mm. Face red-brown, fillet white, crown light green. Antennae in ♂ filiform. Forewings light green; costal edge whitish-ochreous; first line faint, curved; second nearly straight, whitish; cilia white, basal half pale greenish. Hindwings as forewings, but first line absent; termen very obtusely angulated.

England, E. Ireland, local; Europe, WC. and N. Asia; 5, 6. Larva pale green, with purplish dorsal sometimes connected marks; subdorsal line whitish; lateral ridge pale yellow; head purplish: on *Rubus*, hawthorn, etc.; 7-9.

2. Euchloris, *Hb.*

Antennae in ♂ bipectinated, towards apex simple. Palpi shortly rough-scaled. Forewings: 10 out of 9, 11 sometimes anastomosing with 12 or 10. Hindwings: 3 and 4 sometimes stalked, 6 and 7 stalked, 8 very shortly anastomosing with cell near base, thence rapidly diverging.

An extensive genus, principally characteristic of the Indo-Malayan, Australian, and African regions; but there are also a certain number of species in Europe and North America. The neural variations noted sometimes occur within the same species.

1. Forewings with brown tornal blotch . 1. *pustulata.*
„ without brown blotch . . . 2.
2. Face green . . . 2. *smaragdaria.*
„ not green . . . . . 3.
3. Face dull red . . . . 3. *vernaria.*
„ yellow-ochreous . . . 4. *lactearia.*

1. **E. pustulata**, *Hufn.* (*bajularia*, Schiff.) 27-30 mm. Head white, collar green. Forewings green; costal edge white; first

and second lines indistinct, waved, whitish, first thicker near dorsum, second ending in a brown white-bordered tornal blotch; cilia ochreous-whitish, barred with fuscous. Hindwings green; a terminal series of crescentic brown white-bordered marks, much enlarged at apex and tornus; a dark fuscous terminal line; termen rounded; cilia as in forewings.

England to York, not common; C. Europe; 7. Larva pale brown, 5-9 with paler projections, head red-brown: on oak, clothing itself with irregular adhering fragments of leaves; 8-5.

2. **E. smaragdaria**, *F.* 30-32 mm. Head green, lower part of face ochreous-white. Forewings green; costal edge whitish-ochreous; first and second lines waved, white; a small white discal spot; cilia green, tips white. Hindwings green, paler anteriorly; discal spot and cilia as in forewings; termen rounded.

Kent, Essex, very local; C. and S. Europe, N. Asia; 7. Larva grey-brown, 5-9 with projections: on *Artemisia maritima*, clothing itself with irregular adhering fragments of leaves; 8-5.

3. **E. vernaria**, *Hb.* 30-36 mm. Face dull red, fillet white, crown light green. Forewings light green; costal edge white; first line strongly, second slightly curved, white; tips of cilia white. Hindwings as forewings, but paler anteriorly, first line absent; termen very obtusely angulated.

S. England to Hereford and Norfolk, rather common; Europe, N. Asia; 7. Larva green, with white dots, forming by confluence subdorsal and spiracular lines; spiracles reddish; head quadrifid, flesh-colour: on *Clematis vitalba*; 9-6.

4. **E. lactearia**, *L.* 21-24 mm. Head white, face yellow-ochreous. Forewings pale whitish-green (very fugitive); first line curved, second almost straight, white; cilia white. Hindwings as forewings, but second line angulated; termen angulated.

Britain to the Clyde, Ireland, common; N. and C. Europe, N. Asia; 5, 6. Larva dark green; 5-9 with purple posteriorly ochreous-edged dorsal diamonds; 10-13 with a purple dorsal line; head red-brown, bifid: on birch, oak, etc.; 7-9.

3. GEOMETRA, *L.*

Antennae in ♂ bipectinated to apex. Palpi shortly rough-scaled. Thorax hairy beneath. Forewings: 10 out of 9, 11 sometimes anastomosing with 12 and 10. Hindwings: 6 and 7 separate, 8 approximated to cell towards base, diverging from before middle.

As restricted, it contains only two or three species from the European region.

1. **G. papilionaria,** *L.* 45-56 mm. Head green. Forewings green; first and second lines whitish, indistinct, waved; subterminal formed by whitish dots; a darker green linear discal mark; tips of cilia white. Hindwings as forewings, but first line absent; termen waved, bent.

Britain to Ross, Ireland, rather common; N. and C. Europe, N. Asia; 7. Larva green, yellow-speckled, back reticulated with paler; 3 with one, 6-9 with two rosy-tipped projections; 12 and 13 rosy on back; spiracular line yellow; head reddish: on birch, hazel, etc.; 9-5.

4. PSEUDOTERPNA, *Hb.*

Antennae in ♂ bipectinated, towards apex simple. Palpi rough-scaled. Thorax densely hairy beneath. Abdomen with dorsal crests. Forewings: 10 out of 9, 11 sometimes anastomosing with 12 and 10. Hindwings: 6 and 7 separate, 8 approximated to cell towards base, diverging from middle.

A genus of some considerable extent, but principally Indo-Malayan and Australian, correlated with the preceding; there are three strictly European species.

1. **P. pruinata,** *Hufn.* (*cytisaria*, Schiff.) 32-35 mm. Head white mixed with green, face black. Forewings dull green, sprinkled with white; first and second lines dark green, waved, irregular; subterminal cloudy, whitish; a darker green linear discal mark; tips of cilia whitish. Hindwings as forewings, but paler, more whitish basally, markings more indistinct, first line absent; termen rounded.

Britain to the Clyde, Ireland, rather common; C. and S. Europe, WC. Asia to Turkestan; 7. Larva green, white-speckled; dorsal line darker; subdorsal pale yellowish-green; spiracular rosy-white, purple-edged beneath, with a branch down third leg; head and 2 bicuspidate, tips dark red: on *Cytisus*, *Ulex*, *Genista*; 9-6.

4. MONOCTENIADAE.

Hindwings: 5 fully developed, parallel to 4, rising from about or below middle of transverse vein, 8 free or anastomosing shortly near base or seldom from near base to beyond middle (then without areole of forewings), approximated to upper margin of cell to middle or beyond.

This is doubtless to be regarded as a decaying family; in Australia it is still prominent, nearly 100 species being already known, and it is represented to a certain extent in the Indo-Malayan region, but elsewhere only a few stragglers are to be found; it has presumably been supplanted by its descendants. The British forms give no idea of the scope of the family, which is considerable. Imago with body slender, forewings moderately broad or rather elongate, triangular.

Ovum subcylindrical, smooth. Larva more or less elongate, usually with few hairs, prolegs on 7, 8, and sometimes 9 rudimentary or absent. Pupa subterranean or in bark. *Erannis* and *Brephos* are rather nearly allied, but otherwise the genera are too disconnected to be understood except through an acquaintance with exotic forms.

TABULATION OF GENERA.

1.	Forewings with vein 10 out of 9 or absent .	2.
	„ „ „ present, not out of 9 .	3.
2.	Face and palpi roughly hairy . .	4. BREPHOS.
	„ „ smooth-scaled . .	2. APLASTA.
3.	Tongue obsolete	3. ERANNIS.
	„ well-developed . . .	1. BAPTRIA.

1. BAPTRIA, *Hb.*

Face with projecting scales. Tongue developed. Antennae in ♂ evenly ciliated. Palpi moderate, rough-scaled. Thorax hairy beneath. Femora glabrous. Forewings: 10 out of 11, anastomosing with 9. Hindwings: 6 and 7 stalked, 8 closely approximated to cell to near angle, in ♀ sometimes shortly anastomosing near base.

The single species occurs almost throughout Europe.

B. atrata, *L.* (*chaerophyllata*, L.) 23-26 mm. Wholly blackish; apical cilia of forewings white.

Britain to Caledonian Canal, Ireland, locally plentiful; Europe and Asia Minor, N. Asia; 6, 7. Larva green, paler laterally; dorsal line darker, on 13 dark red, broader; subdorsal darker, whitish-edged; subspiracular whitish; spiracles red: on flowers of *Conopodium denudatum*; 5, 6.

2. APLASTA, *Hb.*

Face with appressed scales. Tongue developed. Antennae in ♂ ciliated. Palpi with appressed scales. Thorax glabrous beneath. Femora glabrous. Forewings: 10 absent, 11 anastomosing with 12. Hindwings: 6 and 7 stalked, 8 approximated to cell towards base, diverging from middle.

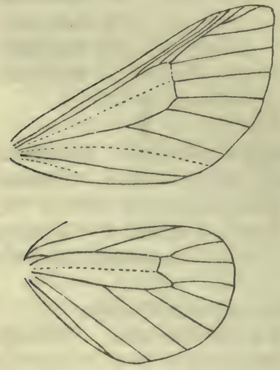
Includes only the one European species. It is a somewhat isolated type, of uncertain affinity.

1. **A. ononaria**, *Fuesl.* 22-27 mm. Head brownish-ochreous. Forewings light ochreous, strigulated with ferruginous; second line formed by a cloudy darker suffusion; subterminal indistinctly pale; terminal band somewhat darker. Hindwings as forewings, but markings hardly indicated.

Kent, apparently a casual only; WC. and S. Europe, Asia Minor, Syria; 5, 6. Larva stout, clothed with stiff short down; dull green, dorsal line darker, spiracular obscurely lighter: on *Ononis spinosa;* 9-4.

3. Erannis, *Hb.*

Face with appressed scales. Tongue obsolete. Antennae in ♂ serrate, ciliated with very long fascicles. Palpi very short, rough-scaled. Thorax somewhat hairy beneath. Femora glabrous. Forewings: 11 sometimes anastomosing with 12 or 10. Hindwings: 6 and 7 stalked, 8 anastomosing with cell to beyond middle. ♀ apterous, with large anal tuft.


Neuration of *Erannis aescularia.*

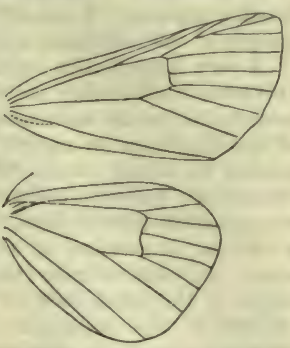
A very small genus, confined to the European region and North America. Larva with rudimentary prolegs on 9.

1. **E. aescularia**, *Schiff.* 29-33 mm. Head brownish. Forewings brown or brownish-ochreous, sprinkled with blackish; first and second lines serrate, whitish, internally margined with blackish-fuscous marks in serrations; a dark fuscous linear discal mark, and oblique apical streak. Hindwings pale whitish-fuscous; a dark fuscous discal dot; second line faintly whitish, curved.

Britain to Perth, Ireland, common (unfrequent in Scotland); C. Europe; 3, 4. Larva yellowish-green; dorsal line dark green, yellow-edged; subdorsal, lateral, and subspiracular yellowish: on oak, elm, etc.; 5, 6. The ♀ moth strews hairs from the anal tuft over her eggs.

4. Brephos, *O.*

Face roughly hairy. Tongue developed. Antennae in ♂ evenly ciliated or shortly bipectinated. Palpi short, clothed with long rough hairs. Thorax hairy beneath. Femora hairy. Forewings: 10 out of 9 or absent. Hindwings: 6 and 7 sometimes stalked, 8 closely approximated to cell to middle, connected or shortly anastomosing with it near base.



Neuration of *Brephos notha.*

A very small genus, confined to north temperate regions; correlated with the preceding. Larva with fully-developed prolegs on 9, and rudimentary ones on 7 and 8. Pupa in a chamber in bark.

Antennae in ♂ dentate; a central white costal blotch 1. *parthenias.*

„ „ bipectinated; no central costal blotch 2. *notha.*

1. **B. parthenias,** *L.* 33-35 mm. Head black. Antennae in ♂ dentate. Forewings dark ochreous-fuscous, dorsally more blackish; first and second lines and praesubterminal blackish, serrate; an oval blackish whitish-centred discal spot; a cloudy white costal blotch before this, and another before subterminal; cilia barred with white. Hindwings orange; discal spot, a very large dorsal blotch, and irregular terminal fascia blackish.

Britain to Caledonian Canal, common; N. and C. Europe, N. Asia, NE. America; 3, 4. Larva green; dorsal line whitish-edged; lateral whitish; subspiracular broader, yellowish; two white dots near spiracles on each segment: on birch; 6, 7.

2. **B. notha,** *Hb.* 28-32 mm. Head dark fuscous. Antennae in ♂ bipectinated. Forewings dark fuscous, sprinkled with whitish; first and second lines blackish, irregular; subterminal pale, anteriorly darker-margined; a blackish pale-centred discal spot; a cloudy white costal spot before subterminal; cilia hardly barred. Hindwings as in *B. parthenias.*

England to York, local; C. Europe, N. Asia; 3, 4. Larva green, sides black; dorsal line darker, yellowish-edged; subdorsal and lateral fine, yellow; subspiracular pale yellow; head and 2 black-spotted: on aspen and *Salix caprea*, between joined leaves; 6.

5. SELIDOSEMIDAE.

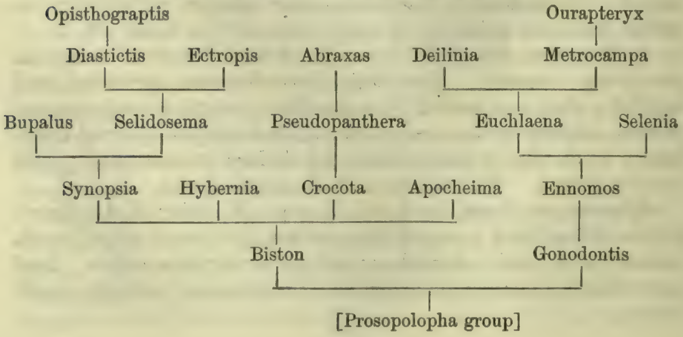
Hindwings: 5 imperfect (not tubular) or obsolete, 6 and 7 usually separate, 8 usually obsoletely connected with upper margin of cell near base, approximated to near middle.

A very large family, equally common throughout all regions. It varies considerably in superficial appearance, and is also remarkable for the variability of structure of veins 10 and 11 of the forewings in many (not all) species. Imago with body slender to rather stout, forewings broad to rather elongate, triangular; posterior tibiae of ♂ often enlarged and enclosing an expansible tuft of hairs. The structure termed the fovea is a circular impression on the lower surface of the forewings above the dorsum near the base, usually placed about the origin of the basal fork of 1b; it is generally confined to the ♂, and is often subhyaline, sometimes surmounted by a small thickened gland; it may possibly be a scent-producing organ. It is strictly confined to that branch of which *Selidosema* is the type, but is not invariably present there. In *Deilinia* a somewhat similar structure occurs in the hindwings.

Ovum subcylindrical or elongate-ovate, more or less reticulated, sometimes ribbed. Larva elongate, more or less slender, with few hairs, without developed prolegs on 7, 8, and usually 9; often remarkably like a twig of its food-plant. Pupa subterranean or in a slight cocoon above ground.

The diagram shows the relations of the principal genera, so far as they can be made out; but the want of definite characters makes conclusions in this family rather conjectural.

PHYLOGENY OF SELIDOSEMIDAE.


Opisthograptis
Ourapteryx
Diastictis
Ectropis
Abraxas
Deilinia
Metrocampa
Bupalus
Selidosema
Pseudopanthera
Euchlaena
Selenia
Synopsia
Hybernia
Crocota
Apocheima
Ennomos
Biston
Gonodontis
[Prosopolopha group]

Tabulation of Genera.

1.	Forewings in ♂ with fovea	2.
	,, ,, without fovea	8.
2.	Antennae in ♂ bipectinated	3.
	,, ,, not pectinated	7.
3.	Hindwings with 6 and 7 stalked	8. TEPHRONIA.
	,, ,, 6 and 7 separate	4.
4.	Palpi and often face roughly hairy	7. BUPALUS.
	,, and face at most rough-scaled	5.
5.	Forewings with 11 rising separate, or if out of 10, from near base only and then not anastomosing with 12	6.
	,, with 11 absent or out of 10 high up, or if lower, anastomosing with 12	2. DIASTICTIS.
6.	Antennae in ♂ bipectinated to apex	5. CLEORA.
	,, ,, with apex simple	6. SELIDOSEMA.
7.	Antennae in ♂ with two short acute processes on each side of each joint	3. ECTROPIS.
	,, without paired processes	1. OPISTHOGRAPTIS.
8.	Antennae in ♂ simple	9.
	,, ,, bipectinated	12.
9.	Antennae in ♂ ciliated with fascicles	10. ABRAXAS.
	,, ,, shortly and evenly ciliated	10.
10.	Face with long rough hairs	14. PSODOS.
	,, not rough-haired	11.
11.	Forewings with 11 absent	19. OURAPTERYX.
	,, with 11 present	11. PSEUDOPANTHERA.
12.	♀ apterous or semiapterous	13.
	,, with fully-developed wings	15.
13.	Face roughly hairy	16. APOCHEIMA.
	,, not hairy	14.
14.	Thorax crested; apex of antennae in ♂ simple	15. HYBERNIA.
	,, smooth; antennae in ♂ pectinated to apex	13. THERIA.
15.	Hindwings in ♂ with subbasal fovea	18. DEILINIA.
	,, ,, without fovea	16.
16.	Antennae in ♂ bipectinated to apex	17.
	,, ,, with apex simple	24.
17.	Face with projecting scales	18.
	,, with tolerably appressed scales	23.

18. Eye crossed by subantennal hair-tuft . 25. Colotois.
,, not crossed by tuft . . . . 19.
19. Forewings with transparent discal scar . 22. Selenia.
,, without transparent scar . . 20.
20. Forewings with 11 connected with 12 . 26. Ennomos.
,, with 11 free from 12 . . . 21.
21. Posterior tibiae hairy, middle-spurs short or absent
17. Biston.
,, ,, glabrous, middle-spurs moderately
long . . . 22.
22. Face with defined conical tuft . 23. Hygrochroa.
,, without defined tuft . 27. Gonodontis.
23. Forewings with 7 out of 9 above middle, 10 out
of 9 . . . 24. Cepphis.
,, with 7 out of 9 below middle, 10 rarely
out of 9 near base . 12. Crocota.
24. Thorax with low double posterior crest 4. Deileptenia.
,, not crested . . . . 25.
25. Femora hairy . . . . 9. Synopsia.
,, glabrous . . . . . 26.
26. Forewings with 10 normally out of 9, and anastomosing with 11 . . 20. Metrocampa.
,, with 10 out of 11, not anastomosing
with 11 . . 21. Euchlaena.

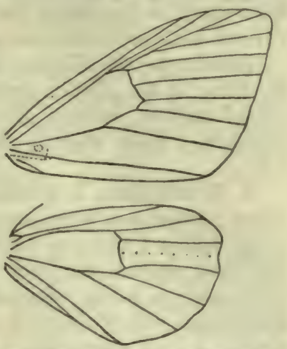
1. Opisthograptis, *Hb.*

Face with appressed scales or short tuft. Tongue developed. Antennae in ♂ filiform or serrate-dentate, ciliated. Palpi rough-scaled. Thorax somewhat hairy beneath. Femora glabrous; posterior tibiae in ♂ more or less dilated, often bent. Forewings in ♂ with fovea; 10 often connected or anastomosing with 12 and 9, 11 out of 10 between connections or usually absent.

A considerable genus, widely distributed, but most numerous in the Indo-Malayan region.

1. Forewings with ferruginous costal spot . . 2.
,, without ferruginous costal spot 4. *clathrata.*
2. Wings yellow . . . . 5. *luteolata.*
,, not yellow . . . . 3.
3. Forewings with blackish spot on middle of second
line . . . . 4.
,, without such spot . . 3. *liturata.*
4. Angulation of second line very obtuse . 2. *alternaria.*
,, , ,, nearly rectangular 1. *notata.*

1. **O. notata**, *L.* 25-28 mm. Head ochreous. Antennae in ♂ dentate. Forewings ochreous-whitish, strigulated with ochreous-grey; first, median, and second lines ochreous-grey, on costa brown, second angulated, in middle traversing an oval blackish spot cut by ochreous-whitish veins; a ferruginous-brown spot on costa beyond second; upper half of termen subconcave, its cilia light brown. Hindwings with colour and median line as in forewings, second partly dotted with dark fuscous; a dark fuscous discal dot; termen subcaudate-angulated.



Neuration of *Opisthograptis luteolata.*

S. England to Suffolk and Gloucester, Cheshire, Inverness, Ross, local; Europe, WC. and N. Asia; 6. Larva dark green, sides yellowish-brown; a dorsal series of yellowish-brown spots: on *Salix* and birch; 8, 9.

2. **O. alternaria**, *Hb.* 25-28 mm. Differs from *O. notata* as follows: colour pale whitish-fuscous, strigulated with grey, hindwings more whitish basally; lines grey, second line less angulated, followed by a darker suffusion, traversed spot much smaller, termen more concave; termen of hindwings more caudate.

Sussex to Devon, Westmoreland, local; C. Europe, WC. and N. Asia; 6, 7. Larva light green; three triangular reddish lateral marks towards middle: on *Salix;* 9.

3. **O. liturata**, *Cl.* 26-29 mm. Head yellow-ochreous. Antennae in ♂ dentate. Forewings pale fuscous, strigulated with darker; first, median, and second lines fuscous, on costa darker, second darker-dotted, followed by a pale reddish-ochreous suffusion, and ferruginous costal spot; a fuscous discal mark; termen subsinuate. Hindwings as forewings, but more ochreous-whitish; first line and costal spot absent; discal dot darker; termen angulated.

Britain to Ross, common; N. and C. Europe, WC. and N. Asia; 5-7. Larva green; dorsal and subdorsal lines whitish; spiracular white; head brown: on *Pinus abies;* 9-10.

4. **O. clathrata**, *L.* 22-26 mm. Head black mixed with whitish. Antennae in ♂ filiform. Forewings yellowish-white or pale yellowish, margins strigulated with dark fuscous, veins

dark fuscous; first, median, second, and praesubterminal lines dark fuscous, irregular: cilia white, barred with dark fuscous. Hindwings as forewings, but first line absent. A dark fuscous variety with pale subterminal spots is not unfrequent.

Britain to the Clyde, Ireland, common; Europe, WC. and N. Asia; 5, 6. Larva green; dorsal line double, white; subdorsal narrow, white; lateral and spiracular white; incisions yellowish; head slightly bifid: on *Trifolium*, *Medicago*, etc.; 8-4.

5. **O. luteolata**, *L.* (*crataegata*, L.) 29-38 mm. Head yellow, lower part of face ferruginous. Antennae in ♂ filiform. Forewings yellow; three or four ferruginous costal spots, last large; first line, second, and part of praesubterminal grey, waved, interrupted; a linear whitish ferruginous-margined discal mark. Hindwings yellow; second and praesubterminal lines as in forewings; a grey discal dot.

Britain to the Hebrides, Ireland, common; Europe, WC. and N. Asia, N. Africa; 5, 6. Larva with rudimentary prolegs on 8 and 9; pale brown, sometimes purplish or greenish-tinged; a pointed projection on 7, directed forwards; two smaller projections on 9: on hawthorn, birch, etc.; 7-4.

2. Diastictis, *Hb.*

Face with appressed scales or short tuft. Tongue developed. Antennae in ♂ bipectinated, apex simple. Palpi rough-scaled. Thorax hairy beneath. Femora glabrous; posterior tibiae in ♂ dilated. Forewings in ♂ with fovea; 10 often connected or anastomosing with 12 and 9, 11 usually absent, or out of 10 above middle, or if lower anastomosing with 12.

A large genus, more or less cosmopolitan; derived from *Selidosema*.

1. Wings ferruginous-ochreous	1. *brunneata.*
,, not ochreous	2.
2. Lines distinct throughout	3.
,, nearly obsolete	2. *wauaria*
3. Discal mark whitish, dark-margined	4. *consortaria.*
,, ,, wholly dark fuscous	3. *roboraria.*

1. **D. brunneata**, *Thnb.* (*pinetaria*, Hb.) 24-26 mm. Head ferruginous-ochreous. Forewings ferruginous-ochreous, strigulated with darker; first, median, second, and praesubterminal lines fuscous, subsinuate. Hindwings as forewings, but lines less distinct, first absent; a fuscous discal dot.

Perth to Ross, common; N. and C. Europe, N. Asia, N.

America; 6, 7. Larva white; dorsal line dark green, finely black-edged; subdorsal rosy-brown, dark-edged; three brown lateral lines; a spiracular series of yellowish marks: on *Vaccinium* and *Pinus sylvestris*; 4, 5.

2. **D. wauaria**, *L.* (*wavaria*, F.) 25-30 mm. Head grey-whitish. Forewings grey-whitish, strigulated with grey; four dark fuscous costal marks, second usually joined with black V-shaped discal mark; termen suffused with light brownish. Hindwings with ground as in forewings; a dark grey discal dot.

Britain to Ross, Ireland, common; N. and C. Europe, N. America; 7, 8. Larva grey-green or lead-grey, with black spots; dorsal surface yellower; a spiracular yellow black-spotted line, sometimes interrupted; head grey, black-spotted: on currant and gooseberry (*Ribes*); 5, 6. This larva seems to mimic the abundant and distasteful larva of the gooseberry sawfly (*Nematus ribesii*).

3. **D. roboraria**, *Schiff.* 48-52 mm. Head whitish sprinkled with fuscous, face fuscous. Forewings whitish or fuscous-whitish, densely sprinkled with fuscous and black; lines waved; first, median, and second blackish-fuscous, median and second approximated and thickened dorsally; subterminal pale, anteriorly partly dark-margined; a dark fuscous discal mark before median. Hindwings as forewings, but first line absent, median straighter, second remote, not thickened, discal mark beyond median.

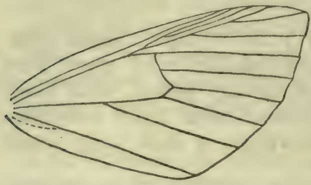
England to York, not common; C. Europe, N. Asia; 7. Larva purplish-brown or ochreous-brown, with variable indications of pale markings; 6 (sometimes also 4) with two subdorsal prominences, 12 with slight dorsal ridge; head bifid: on oak; 8-5.

4. **D. consortaria**, *F.* 43-50 mm. Differs from *D. roboraria* as follows: wings more brownish-tinged, median and second lines hardly thickened dorsally, discal mark linear, whitish, margined with dark grey.

S. England to Leicester, not common; C. Europe, WC. and N. Asia, Japan; 6, 7. Larva greenish-grey; dorsal line darker; lateral paler; 6 with two subdorsal prominences; 12 with slight dorsal ridge: on oak; 8, 9.

3. ECTROPIS, *Hb.*

Face nearly smooth or with somewhat projecting scales. Tongue developed. Antennae in ♂ with two short acute processes on each side of each joint, emitting strong fascicles of cilia. Palpi rough-scaled. Thorax hairy beneath. Femora glabrous; posterior tibiae in ♂ sometimes dilated. Forewings in ♂ with fovea; 10 sometimes out of 9 or absent, sometimes connected with 9, 11 sometimes out of 9 or 10, sometimes anastomosing with 12.



Forewing of *Ectropis biundularia.*

A small genus, but very widely distributed; derived from *Selidosema.*

1. Forewings with a white median subterminal spot 1. *luridata.*
,, without such spot . . . 2.
2. Discal mark of forewings distinct . . 3.
,, ,, ,, absent . . 3. *biundularia.*
3. First line preceded by a dark shade . 4. *consonaria.*
,, ,, not preceded by a dark shade . 2. *punctularia.*

1. **E. luridata**, *Bkh.* (*extersaria*, Hb.) 29-33 mm. Head fuscous-whitish, mixed with dark fuscous. Forewings whitish-fuscous, much strigulated with dark fuscous; first, median, and second lines sinuate, dark fuscous, blackish-marked, second ending in a whitish dorsal spot; subterminal pale, waved, anteriorly dark-margined, marked with clear white central spot; a blackish discal mark. Hindwings as forewings, but lines more indistinct, without white spots, first absent; discal dot obscure.

S. England to Hereford and Norfolk, Lancashire, rather common; C. Europe; 6. Larva pale grey, clouded with reddish-brown: on birch; 8, 9.

2. **E. punctularia**, *Hb.* 25-29 mm. Head white mixed with dark fuscous. Forewings whitish, sprinkled with fuscous and dark fuscous; first, median, and second lines irregular, fuscous, darker-marked, stronger on costa; subterminal whitish, waved, anteriorly fuscous-margined; a dark fuscous discal dot on median. Hindwings as forewings, but lines more indistinct, first absent, discal dot beyond median.

England, Argyll, E. and S. Ireland, common; N. and C. Europe, N. Asia; 5, 6. Larva wrinkled, green; dorsal line yellowish, whitish-margined; subdorsal and two fine lateral lines yellowish-white; incisions yellow; head yellow-green: on birch; 7, 8.

3. **E. biundularia**, *Bkh.* (*crepuscularia*, Hb.; *laricaria*,

Dbld.) 32-40 mm. Head whitish, with dark fuscous frontal bar. Forewings whitish, sometimes tinged with ochreous or fuscous, sprinkled with dark fuscous; first and second lines subserrate, fuscous, black-marked, dorsally approximated; an ochreous or fuscous shade before first, and another, with bidentate dark central mark, beyond second; median and praesubterminal ochreous or fuscous, partly dark-marked. Hindwings as forewings, but first line and shade absent, second shade less dark-marked; a dark fuscous discal mark.

Britain to Perth, Ireland, common; N. and C. Europe, WC. and N. Asia, Japan, N. America; 3-6. Larva brownish-grey, yellowish-grey, or reddish-brown; subdorsal line dark on 4-9; a lateral series of pale blotches, one on 10 conspicuously paler; 4 swollen, with three black spots; 6 with dark V-shaped mark: on oak, beech, larch, etc.; 6-9. This insect varies much locally in depth of colouring and time of appearance.

4. **E. consonaria**, *Hb.* 35-38 mm. Differs from *E. biundularia* as follows: wings and markings more brownish-tinged, not ochreous, first and second line dark fuscous, hardly serrate, not approximated dorsally, first shade darker fuscous, second marked with roundish darker central blotch, a distinct dark fuscous discal mark in forewings.

England to York, E. and S. Ireland, local; C. Europe, WC. and N. Asia; 5. Larva wrinkled, greenish-ochreous, with numerous dull red waved lines; dorsal dull ochreous, brown-edged; incisions greenish; head ochreous-whitish, marked with dark brown: on birch, beech, *Pinus*, etc.; 6-8.

4. Deileptenia, *Hb.*

Face loosely scaled. Tongue developed. Antennae in ♂ bipectinated, apex simple. Palpi rough-scaled. Thorax with low double posterior crest, hairy beneath. Femora glabrous; posterior tibiae in ♂ not dilated. Forewings in ♂ without fovea; 11 sometimes out of 10 near base, sometimes anastomosing with 12.

A small genus, inhabiting the European region; derived from *Selidosema*.

1. **D. abietaria**, *Hb.* 40-44 mm. Head fuscous. Forewings pale ochreous, suffused with brown or dark grey and strigulated with dark fuscous; lines waved; first, median, and second dark fuscous, stronger on costa, median and second closely approximated dorsally; subterminal pale, dark-margined anteriorly; a

dark fuscous discal mark before median. Hindwings as forewings, but lines more indistinct, first absent, discal mark beyond median.

S. England to Gloucester and Essex, Perth, local; C. Europe; 7. Larva light ochreous-brown or dark grey-brown, with paler dorsal patches, especially on 5, 9, and 10; dorsal, subdorsal, and lateral lines pale, brown-edged; 5-9 spotted with black on back: on yew, *Pinus*, etc.; 9-5.

5. Cleora, *Curt.*

Face nearly smooth. Tongue developed. Antennae in ♂ bipectinated to apex. Palpi rough-scaled. Thorax hairy beneath. Femora almost glabrous; posterior tibiae in ♂ not dilated. Forewings in ♂ with fovea; 10 connected or anastomosing with 9.

One species only is known.

1. **C. lichenaria**, *Hufn.* 29-33 mm. Head green-whitish, forehead spotted with dark fuscous. Forewings whitish, suffusedly strigulated with dull greenish and sprinkled with black; first line curved, second strongly sinuate and dentate, black; a green blackish discal spot. Hindwings as forewings, but first line absent, second less sinuate, spot grey.

Britain to Ross, N. Ireland, common; C. Europe; 7. Larva wrinkled, olive-green, variegated with lighter and darker; 5-11 with pairs of slight prominences; 12 with two larger yellow black-tipped prominences; spiracular line sometimes partly blackish: on lichens; 9-5.

6. Selidosema, *Hb.*

Face with appressed or shortly projecting scales. Tongue developed. Antennae in ♂ bipectinated, towards apex simple. Palpi rough-scaled. Thorax sometimes crested posteriorly, hairy beneath. Femora nearly glabrous: posterior tibiae in ♂ dilated. Forewings in ♂ with fovea; 10 sometimes connected with 9, 11 sometimes out of 10 near base only, or if separate, sometimes anastomosing with 12.

A genus of considerable extent, and universally distributed; derived from *Synopsia*.

1. Discal mark whitish, dark-margined .	6. *cinctaria.*
„ „ wholly dark	2.
2. Forewings whitish	3.
„ not whitish	4.

3. Median line of forewings blackish . 4. *angularia.*
„ „ „ marked on costa only
3. *glabraria.*
4. Lines of hindwings obsolete . . 1. *ericetaria.*
„ „ present . . . 5.
5. Second line of forewings projecting below middle
1. *repandata.*
„ „ „ not projecting below middle
5. *gemmaria.*

1. **S. ericetaria**, *Vill.* (*plumaria*, Hb.) 34-36 mm. Head brownish-ochreous, sometimes mixed with whitish. Antennal pectinations very long, 5 or 6 joints simple. Forewings brownish-ochreous or whitish-fuscous, sprinkled with dark fuscous, termen suffused with brownish; first and second lines faint, on costa dark fuscous; median straight, fuscous, variably distinct; praesubterminal cloudy, rather dark fuscous; sometimes a dark fuscous discal spot beyond median. Hindwings as forewings, but lines obsolete.

Sussex to Dorset, Warwick, Cheshire, Arran, E. and S. Ireland, local; C. and S. Europe to Syria; 7, 8. Larva wrinkled, pale grey; dorsal line blackish-brown, double, on 5-12 swollen in middle; subdorsal pale; spiracular pale, brown-edged: on *Calluna*; 9-4.

2. **S. repandata**, *L.* 38-46 mm. Head grey mixed with whitish and fuscous. Forewings light ochreous-brown, sprinkled with black and sometimes with whitish; first line curved, median twice sinuate, dark fuscous, sometimes partly confluent; second dark fuscous, roundly projecting above and below middle; subterminal waved, pale or whitish, partially dark-margined; a blackish discal spot before median. Hindwings as forewings, but lines less marked, regular, discal dot beyond median.

Britain to the Hebrides, N. Ireland, common; N. and C. Europe, N. and C. Asia to N. India and Japan; 7. Larva pale greenish-ochreous, brown-marked, sometimes suffused with dark grey, dusted with yellow; dorsal line brown or dark grey, distinct on 2-4, often obsolete elsewhere; 5-12 sometimes with pale dorsal diamonds: on oak, birch, blackthorn, etc; 9-4.

3. **S. glabraria**, *Hb.* 26-29 mm. Head ochreous-white, forehead dotted with black. Forewings ochreous-white, sprinkled with black; first and second lines grey, black-dotted, forming black costal spots, second twice sinuate; subterminal waved, partially thickly margined with blackish-grey; an oval black discal spot, joined with a blackish costal spot. Hindwings with

ground as in forewings; a blackish-grey discal dot and curved second line.

Surrey to Wilts and Devon, Leicester, Lake District, local; C. Europe; 7, 8. Larva pale blue-green, back more whitish; a dorsal series of black spots; a subdorsal series of black dashes; some small lateral black marks: on lichens; 5, 6.

4. **S. angularia**, *Thnb.* (*viduaria*, Bkh.) 31-32 mm. Head whitish, mixed with black. Forewings ochreous-white strigulated with black, base mixed with light brownish; lines blackish, first curved, median thick, second subserrate, sinuate, followed by a light brownish shade, praesubterminal waved; a black discal mark beyond median. Hindwings brown-whitish, strigulated with grey; three dorsal marks and a discal dot blackish.

Sussex, Hants, scarce; C. Europe; 6. Larva on oak; 8 (?).

5. **S. gemmaria**, *Brh.* (*rhomboidaria*, Hb.; *perfumaria*, Newm.) 34-40 mm. Head fuscous, face with darker pale-edged bar. Forewings brownish, veins light ochreous, strigulated with dark fuscous; first, median, and second lines fuscous or dark fuscous, curved above, second black-dotted, stronger on dorsum; subterminal obscurely whitish, waved; a blackish discal mark before median. Hindwings as forewings, but first line absent, median straight, discal dot beyond it.

Britain to Caledonian Canal, very common (unfrequent in Scotland); C. and S. Europe, WC. and N. Asia; 7. Larva from reddish-brown to dark slaty-grey, dusted with darker and lighter, sometimes forming irregular lines, an interrupted dorsal line, or indistinct diamonds: on oak, blackthorn, birch, etc.; 9-5.

6. **S. cinctaria**, *Schiff.* 30-35 mm. Head fuscous mixed with whitish, face with black bar. Forewings brownish, variably mixed with whitish and sprinkled with black; first line curved, black, preceded by a dark brown shade; median ochreous, sinuate; second black, serrate, sinuate, followed by an ochreous-brown shade; subterminal whitish, waved; a whitish dark-margined discal mark on median. Hindwings as forewings, but first line and shade absent, median straight, discal mark beyond it.

Sussex to Oxford and Dorset, Argyll, S. Ireland, local; N. and C. Europe, WC. and N. Asia; 5, 6. Larva light green, with several fine paler lines; dorsal and lateral lines bluish-green; subdorsal whitish: on *Erica* and birch; 6-8.

7. BUPALUS, *Lch.*

Face roughly or loosely haired. Tongue developed. Antennae in ♂ bipectinated, apex simple. Palpi roughly hairy. Thorax hairy beneath. Femora often hairy; posterior tibiae in ♂ not dilated. Forewings in ♂ with fovea; 10 often connected or anastomosing with 9, 11 usually out of 10, always running into 12 or concealed by anastomosis of 10 with 12 and so apparently absent.

A small genus, characteristic of Europe; correlated with *Selidosema.*

1. Forewings with distinct transverse lines . . 2.
,, without distinct lines . . 3.
2. Median and second lines of forewings approximated dorsally 2. *atomarius.*
,, ,, ,, ,, parallel 3. *carbonarius.*
3. Forewings with large dark triangular apical patch 1. *piniarius.*
,, without such patch . .. 4. *limbarius.*

1. **B. piniarius**, *L.* 32-35 mm. ♂. Antennal pectinations long. Forewings blackish-fuscous; costa and dorsum anteriorly and base mixed with light yellow-ochreous; a very large oblique anterior pale ochreous-yellowish patch in disc, cut by two suffused dark veins. Hindwings blackish fuscous; an elongate discal blotch and a variable irroration beneath this pale ochreous-yellowish, crossed by two thick lines. In ♀ the pale colour is replaced throughout by orange, and the dark by deep ferruginous.

Britain to Ross, E. Ireland, common; N. and C. Europe, N. Asia; 5-7. Larva pale blue-green: dorsal line white; subdorsal bluish-white, edged above and divided by blue-green lines; lateral pale yellow: on *Pinus sylvestris* and larch; 8-9.

2. **B. atomarius**, *L.* 24-29 mm. Antennal pectinations very long. Forewings ochreous-yellow or yellowish-white, strigulated with dark ferruginous; lines dark ferruginous, first curved, median and second sinuate, sometimes confluent dorsally, praesubterminal interrupted in middle. Hindwings as forewings, but lines regular, entire, first absent; a dark ferruginous discal dot.

Britain to the Orkneys, Ireland, common; Europe, WC. and N. Asia; 5-7. Larva brown; dorsal line double, pale; subdorsal pale; spiracular reddish, edged above with a group of fine black lines; incisions reddish: on *Erica, Lotus, Trifolium;* 7-9.

3. **B. carbonarius**, *Cl.* 20-21 mm. Antennal pectinations moderate. Forewings white, slightly ochreous-tinged, strigulated with blackish; lines blackish, first slightly curved, median and second sinuate, praesubterminal somewhat interrupted; a blackish discal mark beyond median. Hindwings as forewings, but first line absent.

York to Ross, local; N. and mountains of C. Europe; 5. Larva dull brown, with very obscure darker stripes: on *Vaccinium*, *Erica*, birch; 6, 7.

4. **B. limbarius**, *F.* (*conspicuata*, Schiff.) 23-26 mm. Antennal pectinations moderate. Forewings orange, costa strigulated with blackish, and sometimes a few strigulae elsewhere; a terminal blackish fascia. Hindwings orange, sprinkled or strigulated with blackish.

Suffolk, Norfolk, Perth, local; WC. Europe; 6, 7. Larva greenish-grey; dorsal line darker; subdorsal double, dark grey, greenish-edged; lateral black; spiracular yellow; head pale brown, black-marked: on *Cytisus;* 8, 9.

8. TEPHRONIA, *Hb.*

Face with appressed scales. Tongue weak. Antennae in ♂ bipectinated, towards apex simple. Palpi very short, rough-scaled. Thorax somewhat hairy beneath. Femora glabrous; posterior tibiae with end-spurs only, in ♂ somewhat dilated. Forewings in ♂ and ♀ with fovea; 9 and 10 absent. Hindwings: 6 and 7 stalked.

A peculiar little group, containing only three European species; correlated with *Selidosema.*

1. **T. sepiaria**, *Hufn.* (*cineraria*, Hb.) 20-22 mm. Head whitish-grey. Forewings with scales partly suberect; pale grey, sprinkled with black; lines sinuate, first and second black, median fuscous, very indistinct. Hindwings fuscous-whitish, termen fuscous-sprinkled; median line very faint, second grey, sinuate; a grey discal dot.

Pembroke (once); C. and S. Europe, WC. Asia; 7. Larva wrinkled, dull whitish-grey or greenish-grey; dorsal line paler, dilated on each segment, partly double; subdorsal double, darker, interrupted; some lateral interrupted streaks: on lichens growing on walls; 5, 6.

9. SYNOPSIA, *Hb.*

Face loosely scaled. Tongue developed. Antennae in ♂ bipectinated, towards apex simple. Palpi rough-scaled. Thorax densely hairy beneath. Femora hairy; posterior tibiae in ♂ dilated. Forewings in ♂ without fovea; 10 often connected or anastomosing with 9, sometimes with 12 also, 11 out of 10, usually anastomosing with 12, rarely with 10 also.

Restricted to a few species inhabiting the European region and India; derived from the *Biston* group.

1. **S. abruptaria**, *Thnb.* 29-35 mm. Forewings pale ochreous; costal edge strigulated with blackish; first line oblique, curved, dark fuscous, preceded by a reddish-brown line; median faint, reddish-brown; second twice sinuate, black, followed by a reddish-brown shade ending in a subapical blotch; subterminal pale, waved, partly edged with reddish-brown, usually preceded by a blackish-grey suffusion above middle; a black discal dot. Hindwings pale ochreous, strigulated with reddish-grey; a broad reddish-brown postmedian band, darker posteriorly, enclosing straight slightly waved black second line; termen dentate.

England, Aberdeen (?), common; SC. Europe, Asia Minor; 4-6. Larva blackish-brown; a whitish anterior band on 2: on *Ligustrum*, rose, etc.; 6-8. The imago when at rest with outstretched wings appears to imitate a wood-growing fungus.

10. Abraxas, *Lch.*

Face smooth. Tongue developed. Antennae in ♂ stout, ciliated with fascicles. Palpi shortly rough-scaled. Thorax hairy beneath. Femora glabrous; posterior tibiae in ♂ dilated. Forewings in ♂ without fovea; 10 sometimes connected with 9, 11 out of 10, anastomosing with or running into 12, or absent.

A genus of rather limited extent, mainly Asiatic.

1. Abdomen orange . . . . . . 2.
   „ not orange . . . . 3.
2. Wings with orange-brown tornal blotch . 2. *sylvata.*
   „ without such blotch . 1. *grossulariata.*
3. Wings with terminal blackish band . 4. *marginata.*
   „ without such band . . 3. *adustata.*

1. **A. grossulariata**, *L.* 36-43 mm. Head black. Thorax and abdomen light orange, spotted with black. Forewings ochreous-white; first line curved, very near base, second sinuate, orange, margined with rows of subconfluent black spots; a sinuate median, and a terminal series of black spots; sometimes a small black discal spot. Hindwings ochreous-white, with median, second, and terminal series of black spots, but much reduced. Liable to great variation in the development of the black markings.

Britain to the Hebrides, Ireland, abundant; N. and C. Europe, WC. and N. Asia, Japan; 7-8. Larva ochreous-whitish; a dorsal series of large broken black spots; subdorsal and lateral series of small black spots; spiracular line orange; head blackish: on gooseberry and currant (*Ribes*), blackthorn, etc.; 9-5.

[*A. pantaria*, L., a South European species nearly resembling *A. sylvata*, but with orange head, all grey markings much reduced, and cilia wholly white, has been recorded from Somerset and I. of Man, but there is little doubt that exceptional varieties of *A. sylvata* were mistaken for it].

2. **A. sylvata**, *Sc.* (*ulmata*, F.) 36-43 mm. Head dark fuscous. Thorax and abdomen dull orange spotted with blackish. Forewings ochreous-white; a fuscous and orange basal patch mixed with metallic grey; second line forming a sinuate double series of orange-brown and grey spots ending in an orange and brown dorsal blotch marked with a wavy grey streak; a discal blotch and irregular terminal streak grey; sometimes a median series of grey spots; cilia mostly grey. Hindwings with colour and second line as in forewings; a grey discal spot.

Britain to the Hebrides, Ireland, common; C. Europe, Asia, Japan; 6, 7. Larva bluish-white, with eleven black lines; head black: on elm; 8, 9. This widely-ranging species varies much geographically and seasonally; Indian and Chinese forms are often very large, Japanese usually have the dark markings strongly developed.

3. **A. adustata**, *Schiff.* 23-25 mm. Head and thorax dark fuscous. Abdomen whitish. Forewings ochreous-white; first line curved, blackish, limiting a dark ashy-fuscous basal patch; median sometimes indicated by dots; second angulate-sinuate, grey edged with ochreous-brown, followed by an ashy-grey band mixed with dark fuscous; postsubterminal partly brownish-ochreous, mixed with dark grey; a grey discal dot. Hindwings ochreous-white; second lines and margins of subterminal pale grey; a dark grey discal dot.

England, Arran, Hebrides, Ireland, common; C. and S. Europe, Asia Minor; 5-7. Larva green; 6-8, 11, 12 with elongate red dorsal spots, edged on sides with black and then with white; 6, 7, 10, 11 with lateral red and yellow spots; subdorsal and spiracular lines slender, white; head reddish: on *Euonymus*; 6, 8, 9.

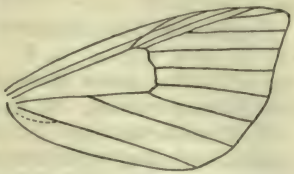
4. **A. marginata**, *L.* 22-26 mm. Head, thorax, and abdomen

rather dark fuscous. Forewings ochreous-white; markings dark fuscous; a blotch along basal half of costa; a median series of three blotches, two upper often confluent, third often absent; a terminal fascia, excavated in middle. Hindwings as forewings, but first blotch absent, median series small or absent.

Britain to Ross, Ireland, common; N. and C. Europe, N. Asia, Japan; 5-7. Larva dull green, with black dots; six dark green lines; incisions yellowish; spiracular line bluish-white; head purplish-marked: on *Salix caprea;* 6, 8, 9.

11. PSEUDOPANTHERA, *Hb.*

Face usually rounded or prominent. Tongue developed. Antennae in ♂ stout, flatly subdentate, shortly and evenly ciliated. Palpi rough-scaled. Thorax hairy beneath. Femora glabrous; posterior tibiae in ♂ sometimes dilated. Forewings in ♂ without fovea; 10 sometimes out of 9, usually connected or anastomosing with 9, 11 sometimes out of 10 or anastomosing with 10, sometimes anastomosing with 12.



Forewing of *Pseudopanthera macularia.*

Rather numerous in species, but principally European, though with occasional representatives in other regions.

1. Wings orange . . . . 4. *macularia.*
   „ not orange . . . . 2.
2. Forewings white or whitish . . . 3.
   „ not whitish . . . . 5.
3. Forewings with two dark costal spots . 2. *bimaculata.*
   „ without such spots . . . 4.
4. Forewings with transverse markings . 1. *punctata.*
   „ without transverse markings . 9. *lineata.*
5. Second line of forewings straight. . 8. *petraria.*
   „ „ „ sinuate, waved . . 6.
6. First line of forewings angulated in middle 7. *hippocastanaria.*
   „ „ „ not angulated . . 7.
7. Discal spot of hindwings pale-centred . 5. *obscuraria.*
   „ „ „ not pale-centred . 8.
8. Subterminal line of forewings whitish . 6. *obfuscaria.*
   „ „ „ absent . 3. *pictaria.*

1. **P. punctata,** *F.* (*temerata,* Hb.) 25-28 mm. Head white. Forewings white, sometimes sprinkled with black; dorsal end

of first line, and margins of subterminal suffusedly irrorated with dark grey, especially towards termen above middle; a black discal dot. Hindwings as forewings, but markings much fainter, first line absent.

England, S. Ireland, rather common; C. Europe, N. Asia; 5, 6. Larva green; dorsal line yellow, later becoming a series of brown-edged spots; head with two orange black-edged marks: on hawthorn, blackthorn, cherry; 7, 8.

2. **P. bimaculata**, *F.* (*taminata*, Hb.) 25-28 mm. Head white, face fuscous. Forewings ochreous-white; first and second lines faint, waved, sinuate, dotted with fuscous, forming small dark fuscous spots on costa; an indistinct blackish discal dot. Hindwings as forewings, but first line absent, no costal spot.

England to York, Ireland, rather common; C. Europe, WC. and N. Asia, Japan; 5, 6. Larva green; dorsal line darker, marked with a series of broad arrowhead-shaped black spots; head black-sprinkled: on blackthorn and cherry; 7, 8.

3. **P. pictaria**, *Curt.* 24-27 mm. Head fuscous. Forewings fuscous, sprinkled with darker; first line hardly curved, second subsinuate, waved, dark fuscous; a dark fuscous discal spot. Hindwings whitish-fuscous, dorsum sprinkled with darker; a grey discal dot and waved second line.

Kent to Hants and Essex, local; W. Europe; 4. Larva brown-grey; 5-8 with a dark V-shaped dorsal mark; 12 with a black transverse line; 8, 9 with whitish lateral patches; 3, 4 with a short oblique black lateral streak; 6-9 with black lateral spots: on blackthorn; 6, 7.

4. **P. macularia**, *L.* 25-28 mm. Head yellow mixed with black. Forewings orange, towards base strigulated with dark fuscous; markings blackish mixed with orange; first, median, second, and subterminal series of three irregular spots each, sometimes partially confluent, or absent except on costa; an interrupted terminal streak. Hindwings as forewings, but first series obsolete.

Britain to Ross, Ireland, rather local; Europe, Asia Minor; 5, 6. Larva pale green; dorsal line double, dark green; subdorsal double, pale; lateral pale; spiracular white, dark-edged above: on *Stachys sylvatica* and *Reseda;* 7-9.

5. **P. obscuraria**, *Hb.* (*pullata*, Stt.) 28-34 mm. Head dark grey mixed with whitish. Forewings brown-grey, strigulated with whitish and sprinkled with black; first and second lines slightly curved, waved, fuscous, black-dotted; praesubterminal

obscurely darker; a whitish blackish-edged discal spot. Hindwings as forewings, but first line absent; termen dentate.

Britain to Ross, Ireland, rather local; C. Europe, Asia Minor; 7, 8. Larva stout, grey, indistinctly darker-marked; dorsal line paler, especially on anterior part of each segment, edged with oblique darker marks; 12 with two tubercles: on grasses, *Poterium*, *Helianthemum*, etc.; 9-5. The imago varies in depth of colouring somewhat in accordance with the soil of its locality.

6. **P. obfuscaria**, *Hb.* 38-44 mm. Head dark brown-grey mixed with whitish. Forewings fuscous, strigulated with ochreous-whitish; first line slightly curved, second sinuate, waved, dark fuscous; subterminal ochreous-whitish, waved; a dark fuscous usually pale-centred discal spot. Hindwings as forewings, but first line absent, discal spot not pale-centred; termen waved.

Lanark to the Hebrides, E. Ireland, common; N. and mountains of C. Europe, NC. Asia; 7, 8. Larva stout, grey; dorsal line double, darker, posteriorly forming disconnected V-shaped marks; subdorsal pale, blackish-edged, with thick marks towards incisions; spiracular darker, pale-edged beneath; 12 with two tubercles: on *Calluna*, *Genista*, etc.; 9-6.

7. **P. hippocastanaria**, *Hb.* 28-31 mm. Head dark fuscous, sometimes whitish-sprinkled. Forewings rather elongate, fuscous, sprinkled with whitish and more thickly with dark fuscous; lines obscurely whitish, dark-edged internally, first sharply angulated in middle, second subsinuate, serrate; a dark fuscous discal mark. Hindwings whitish-fuscous; second line faint, darker, curved.

Kent to Somerset and Suffolk, local; W. and S. Europe, Asia Minor, N. Africa; 5. Larva dull olive-green; head large: on *Calluna* and *Erica*; 9-4.

8. **P. petraria**, *Hb.* 27-32 mm. Head whitish-ochreous. Forewings light brownish-ochreous, sprinkled with dark fuscous; first and second lines nearly straight, whitish, edged anteriorly with dark brown, second more broadly; subterminal faintly whitish; a dark fuscous discal dot. Hindwings whitish-ochreous, sprinkled with dark fuscous except towards costa; second line subsinuate, pale, suffusedly edged with fuscous anteriorly.

Britain to Perth, Ireland, common; C. Europe, WC. and N. Asia, Japan; 5, 6. Larva olive-green; dorsal, subdorsal, lateral, and spiracular lines double, reddish-brown; subspiracular whitish: on bracken (*Pteris aquilina*); 6, 7.

9. **P. lineata**, *Sc.* (*dealbata*, L.) 34-44 mm. Head ochreous-white. Forewings and hindwings ochreous-whitish; costal edge, veins, and terminal line dark grey.

Kent to Dorset and Gloucester, E. Ireland, local; Europe, WC. and N. Asia; 6. Larva ochreous or brownish; dorsal, subdorsal, and lateral lines double, darker; subspiracular darker: on grasses (*Brachypodium*, etc.); 9-5.

12. CROCOTA, *Hb.*

Face prominent or nearly flat, with appressed scales. Tongue developed. Antennae in ♂ bipectinated to apex. Palpi rough-scaled. Thorax hairy beneath. Femora glabrous; posterior tibiae in ♂ sometimes dilated. Forewings in ♂ without fovea; 10 rarely out of 9, usually connected or anastomosing with 9, 11 usually connected or anastomosing with 12, occasionally with 10 also. Hindwings: 6 and 7 sometimes stalked.

Characteristic of the European region, and fairly numerous, with occasional stragglers elsewhere.

1. Median line present . . . 2. *strigillaria.*
,, ,, absent . . . . 2.
2. First line of forewings present . . . 3.
,, ,, ,, absent . . 3. *gilvaria.*
3. Head yellow . . . . 4. *ochrearia.*
,, whitish . . . . 1. *belgaria.*

1. **C. belgaria**, *Hb.* 30-37 mm. Head whitish. Forewings greyish-ochreous, mixed with whitish and sprinkled with dark fuscous; lines fuscous, dotted with black, first straight or bent, second sinuate, followed by a thick dark fuscous shade towards dorsum and sometimes above middle; a blackish discal spot. Hindwings as forewings, but first line and shade beyond second absent, discal spot dark grey.

Britain to the Orkneys, N. Ireland, local; C. Europe; 6. Larva fuscous-grey; dorsal line sometimes paler or ochreous-whitish, broad; 12 with a strong bifid prominence; 13 with two points: on *Erica* and *Calluna*; 8-4.

2. **C. strigillaria**, *Hb.* 32-35 mm. Head white sprinkled with ochreous and black. Forewings light brownish-ochreous, suffused with whitish and sprinkled with fuscous; first line angulated near costa, median, second, and praesubterminal nearly straight, ochreous-fuscous; sometimes a blackish discal dot. Hindwings as forewings, but first line absent.

England, Moray, Ross, N. and W. Ireland, rather common; C. Europe, WC. Asia; 6, 7. Larva grey-brown, marked with darker and lighter; 8 and 10 with pairs of small tubercles, 9 with a larger pair; 13 with two points: on *Erica*, *Calluna*, *Cytisus*; 8-5.

3. **C. gilvaria**, *F.* 28-34 mm. Head pale yellowish. Forewings pale ochreous-yellowish, thinly strigulated with pale brownish; costal edge mostly fuscous; second line straight, fuscous, running to near apex, not reaching dorsum; a fuscous discal spot. Hindwings yellow-whitish; a grey discal spot and faint second line.

S. England to Suffolk and Gloucester, W. Ireland, local; C. Europe, WC. and N. Asia, N. America; 8. Larva light greyish-ochreous, with several indistinct paler and darker lines; 13 with two points: on *Thymus*, *Potentilla*, etc.; 9-7.

4. **C. ochrearia**, *Ross.* (*citraria*, Hb.) 26-32 mm. Head ochreous-yellow. Forewings ochreous-yellow, in ♀ whitish-ochreous, strigulated with deeper yellow or fuscous; lines grey, first rather curved, second nearly straight; a grey discal spot. Hindwings yellow-whitish; a grey discal spot and incomplete second line.

England to Cheshire, Dumfries, local; S. Europe, Asia Minor, Syria, N. Africa; 5, 8. Larva pale yellowish-ochreous; dorsal line ochreous-brown, pale-edged; subdorsal ochreous-brown; head whitish, brown-marked; 13 with two long points: on grass, *Lotus*, etc.; 6, 7, 9, 10.

13. Theria, *Hb.*

Face with appressed scales. Tongue weak. Antennae in ♂ bipectinated to apex. Palpi very short, rough-scaled. Thorax slightly hairy beneath. Femora glabrous; posterior tibiae in ♂ not dilated. Forewings in ♂ without fovea; 10 out of 9, often connected or anastomosing with 9, 11 out of 9, anastomosing or connected with 12 and 10. Wings of ♀ rudimentary.

This includes only the single European species; it is correlated with the preceding.

1. **T. rupicapraria**, *Hb.* 27-30 mm. Head fuscous, fillet whitish. Forewings brown, faintly reddish, sprinkled with darker; lines darker fuscous, first faint, curved, second slightly curved, posteriorly pale-edged; a dark fuscous discal spot. Hindwings fuscous-whitish; a dark grey discal dot and curved second line. Wings of ♀ grey, with dark fuscous median band.

Britain to Forfar, Ireland, common; C. Europe, Asia Minor;

2. Larva green or brown; dorsal line double, whitish; subdorsal whitish; lateral and spiracular whitish, interrupted; sometimes a dorsal series of square brown marks alternating with whitish: on hawthorn and blackthorn; 4-6.

14. Psodos, *Tr.*

Face with long rough hairs. Tongue developed. Antennae in ♂ stout, shortly ciliated. Palpi with long projecting hairs. Thorax roughly hairy beneath. Femora hairy; posterior tibiae in ♂ not dilated. Forewings in ♂ without fovea; 10 absent, 11 anastomosing or connected with 12. Hindwings: 6 and 7 sometimes stalked.

A small alpine genus, confined to the European mountains; correlated with *Crocota.*

1. **P. coracina**, *Esp.* (*trepidaria*, Tr., non Hb.) 22-24 mm. Head black. Forewings blackish-grey, much sprinkled with whitish; first and second lines rather curved, waved, blackish; subterminal obscurely whitish, waved; a black discal spot. Hindwings blackish-grey, posteriorly whitish-sprinkled; markings as in forewings, but indistinct, first line absent.

Perth to Ross, rather common; mountains of N. and C. Europe; 7.

15. Hybernia, *Latr.*

Face with appressed or short rough-scales. Tongue developed or weak. Antennae in ♂ bipectinated, pectinations sometimes short and terminating in fascicles of cilia, apex simple. Palpi shortly rough-scaled. Thorax with small triangular anterior crest, hairy beneath. Femora glabrous; posterior tibiae in ♂ not dilated. Forewings in ♂ without fovea; 10 sometimes out of 9, sometimes anastomosing or connected with 9, 11 sometimes out of 10, usually anastomosing with or running into 12, rarely absent. ♀ apterous or with rudimentary wings.

A small genus, characteristic of the European region, though stragglers occur elsewhere: the species all emerge in winter.

1. Antennal pectinations short, ending in long fascicles 4. *defoliaria.*
„ „ moderate, normal . . 2.
2. Second line of forewings twice sinuate 1. *leucophaearia.*
„ „ „ once sinuate . . 3.
3. Forewings ochreous-orange . . 3. *aurantiaria.*
„ whitish-ochreous . . 2. *marginaria.*

1. **H. leucophaearia,** *Schiff.* 27-32 mm. Forewings ochreous-whitish, strigulated with fuscous and sprinkled with black; basal area often brown; first line curved, second twice sinuate, blackish; median fuscous, nearly straight; sometimes a brown band beyond second; subterminal whitish, margins sometimes brown. Hindwings with ground as in forewings; median and second line indistinctly indicated. Wings of ♀ mixed with brown and whitish.

Britain to Forfar, Ireland, common; C. Europe, N. Asia, Japan; 2, 3. Larva pale brownish-ochreous, pale green, or olive-green; dorsal line white or yellowish, double; subdorsal whitish; sometimes a dorsal series of brown marks: on oak; 5, 6.

2. **H. marginaria,** *Bkh.* (*progemmaria*, Hb.) 31-37 mm. Forewings whitish-ochreous, mixed with brownish-ochreous and sprinkled with dark fuscous; first and median lines indistinct, fuscous, first slightly curved, median nearly straight; second dark fuscous, sinuate on upper half, often followed by a brownish band; a fuscous discal spot; termen black-dotted. Hindwings pale whitish-ochreous, fuscous-sprinkled; discal dot and second line grey. Wings of ♀ brownish, with black transverse lines, hindwings longer than forewings.

Britain to Aberdeen, Ireland, common; C. Europe; 2, 3. Larva light brown, grey, or greenish-ochreous, darker-marked; dorsal line pale, dark-edged; spiracular pale; head reddish-brown: on hazel, *Salix*, etc.; 5, 6.

3. **H. aurantiaria,** *Esp.* 35-40 mm. Forewings ochreous-orange, strigulated with fuscous; lines light purplish-fuscous, first slightly curved, median straight, second sinuate on upper half, sometimes followed by a pale brownish shade; praesubterminal sometimes brownish; a light fuscous discal spot. Hindwings whitish-ochreous, margins orange-tinged; median and second lines as in forewings; a dark grey discal dot. Wings of ♀ dark brown, with black transverse lines.

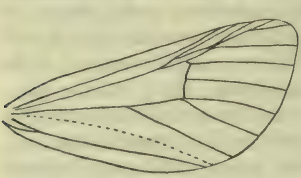
Britain to Aberdeen, Ireland, rather common; C. Europe; 10, 11. Larva dull greenish-blackish; dorsal line yellow or pale brown: on elm, oak, birch, etc.; 5, 6.

4. **H. defoliaria,** *Cl.* 35-40 mm. Antennal pectinations short, fasciculated. Forewings whitish-ochreous or light reddish-ochreous, strigulated with dark fuscous; lines blackish, sometimes obsolete, first angulated, second angulate-sinuate, first preceded and second followed by a reddish-ochreous band; usually a blackish discal spot. Hindwings whitish-ochreous, sprinkled with grey; a dark grey discal dot. ♀ apterous.

Britain to Caledonian Canal, Ireland, common; N. and C. Europe, N. America; 10, 11, 2. Larva dark grey, longitudinally brown-marked; dorsal line pale, brown-edged; spiracular bright yellow, broad, interrupted, on 4-9; head and 13 orange-brown: on oak, beech, hawthorn, etc.; 5, 6.

16. Apocheima, *Hb.*

Face roughly hairy. Tongue very short or rudimentary. Antennae in ♂ bipectinated to apex, or with apex simple. Palpi rough-haired. Thorax densely hairy above and beneath, with slight anterior triangular crest. Femora densely hairy; posterior tibiae in ♂ not dilated, middle-spurs short (*pedaria*) or absent. Forewings in ♂ without fovea; 10 usually anastomosing or connected with 9, 11 sometimes out of 10 or running into 12 or concealed by anastomosis of 10 with 12. Hindwings: 6 and 7 sometimes stalked. ♀ almost apterous.



Forewing of *Apocheima zonaria.*

A rather limited group, almost confined to the European region. Imago with thorax rather stout, forewings less broad than usual.

1. Thorax striped with whitish . . 1. *zonaria.*
,, not striped with whitish . . . 2.
2. Antennal pectinations pale ochreous . 2. *hispidaria.*
,, ,, blackish . . 3. *pedaria.*

1. **A. zonaria**, *Schiff.* 27-29 mm. Antennae pectinated to apex. Thorax dark fuscous, whitish-striped. Abdomen blackish, segmental margins reddish-ochreous. Forewings whitish; veins dark fuscous; costa, first line, second, and margins of subterminal rather thick, fuscous. Hindwings as forewings, but first line absent, second slender. ♀ with rudimentary wings fuscous, whitish-haired.

Flint to Lancashire, NE. Ireland, local; C. Europe, Asia Minor; 4. Larva ochreous-yellowish, with irregular black markings forming indistinct lines, or green, marked with whitish; spiracular broad, pale yellow; head flesh-colour, brown-speckled: on *Achillea millefolium*, rose, etc.; 5, 6.

[*A. lapponaria*, B., an alpine species of N. and C. Europe, with thorax and abdomen blackish mixed with pale red, forewings whitish-grey with indistinct blackish-grey lines, costa blackish mixed with red, has been recorded from Perth, but the record appears untrustworthy.]

2. **A. hispidaria**, *F.* 32-34 mm. Antennae pectinated to apex, pale ochreous. Thorax blackish mixed with whitish. Abdomen blackish. Forewings light ochreous-grey, sprinkled with black; first, median, and second lines curved, dark fuscous, sometimes suffused, second serrate; praesubterminal broad, waved, rather dark fuscous. Hindwings as forewings, but paler, markings very faint. ♀ apterous; antennae and tibiae hairy.

England to York, local; C. Europe; 3. Larva purplish-brown; 8 and 9 with pairs of reddish tubercles; 12 with two pale marks; head yellow-brown, marked with red-brown: on oak; 5, 6.

3. **A. pedaria**, *F.* (*pilosaria*, Hb.) 38-46 mm. Apex of antennae simple. Forewings mixed with pale ochreous and fuscous, faintly greenish, sprinkled with black; first, median, second, and praesubterminal lines irregular, waved, fuscous, marked with blackish; a fuscous discal spot. Hindwings whitish or light grey, sprinkled with fuscous; second line irregular, fuscous. ♀ apterous; tibiae not hairy.

Britain to Caledonian Canal, N. Ireland, common; C. Europe, N. Asia, Japan; 1-3. Larva grey-brown or greyish-ochreous, with spots or patches suffused with pale rosy; 5-7, 12 each with four tubercles bearing bristles; 8-11 with similar less developed tubercles: on elm, oak, etc.; 5, 6.

17. BISTON, *Lch.*

Face hairy or rough-scaled. Tongue developed or obsolete. Antennae in ♂ strongly bipectinated to apex, or with apex simple. Palpi hairy or rough-scaled. Thorax densely hairy above and beneath, with slight loose anterior crest. Femora densely hairy; posterior tibiae hairy, in ♂ not dilated, middle-spurs very short (*betularius*) or absent. Forewings in ♂ without fovea; 10 usually connected or anastomosing with 9, 11 usually out of 10, seldom separate or absent.

A rather small group, inhabiting India and Africa as well as Europe. Imago with body rather stout, forewings less broad.

1. Second line of forewings twice angulated . . 2.
   „ „ „ not angulated . 1. *hirtarius*.
2. Forewings with two brown bands . 2. *stratarius*.
   „ without brown bands . . 3. *betularius*.

1. **B. hirtarius**, *Cl.* 38-50 mm. Apex of antennae simple.

Forewings pale greyish-ochreous, much sprinkled with dark fuscous; first line, median, second, and margins of subterminal dark fuscous, first curved, double, second subsinuate, double; sometimes a dark fuscous discal spot. Hindwings as forewings, but lighter, markings more indistinct, first line absent.

England to York, Ayr, local; N. and C. Europe; 4, 5. Larva reddish-brown or purplish-brown, with indistinct darker lines; 2 with a yellowish brown-marked transverse band; 5-10 each with four yellowish dots; 12 with two prominences: on elm, oak, etc.; 6, 7. There is some evidence that in this species, contrary to the usual rule, it is the ♂ which attracts the ♀.

2. **B. stratarius**, *Hufn.* (*prodromaria*, Schiff.) 46-52 mm. Antennae pectinated to apex. Forewings whitish, strigulated with brown and black; first and second lines twice angulate-sinuate, blackish, first preceded and second followed by a brown band; median indistinct, on costa black; a blackish discal spot. Hindwings whitish, strigulated with grey; median and second lines straight, grey, second followed by a pale reddish tinge.

England, rather common; C. Europe; 3, 4. Larva pale ashy-grey, black-speckled; 8 and 12 with pairs of small prominences; 9 with two larger reddish prominences, on a reddish or yellowish mark; head brown, yellowish-marked: on oak, birch, elm; 6, 7.

3. **B. betularius**, *L.* 45-52 mm. Apex of antennae simple. Forewings white, strigulated with black; first and second lines black, first curved, double, second twice angulate-sinuate; median indistinct, on costa black; margins of subterminal partly dark fuscous; a blackish discal spot. Hindwings as forewings, but first line absent. A wholly blackish variety is locally common.

Britain to Ross, N. and E. Ireland, common; N. and C. Europe, N. Asia; 5, 6. Larva brown, grey, or greenish; 9 and 12 with pairs of prominences; head conspicuously bifid: on elm, poplar, ash, etc.; 8-10.

18. DEILINIA, *Hb.*

Face smooth. Tongue developed. Antennae in ♂ bipectinated, towards apex simple. Palpi rough-scaled. Thorax rather hairy beneath. Femora glabrous; posterior tibiae in ♂ not dilated. Forewings in ♂ without fovea; 10 out of 9, rarely also 11 out of 9. Hindwings in ♂ with circular hair-fringed fovea at base of 8 beneath.

Though only including a few species, the genus ranges throughout the Northern hemisphere, and one member is found in Australia; derived from near *Euchlaena*.

Head wholly white . . . . . 1. *pusaria*.
,, with ochreous and black frontal bar . 2 *exanthemata*.

1. **D. pusaria**, *L.* (*rotundaria*, Hw.) 27-30 mm. Head white. Forewings white, sprinkled with dark grey; first, median, and second lines straight, grey, first angulated or obsolete near costa. Hindwings as forewings, but lines slightly curved, first absent.

Britain to the Hebrides, Ireland, very common; N. and C. Europe, WC. and N. Asia; 5, 6. Larva pale green or brown; a dorsal sometimes incomplete series of purple-red marks (in brown specimens darker brown), sometimes white-edged; sometimes an interrupted reddish lateral line: on hazel, birch, etc.; 7-9.

2. **D. exanthemata**, *Sc.* 27-29 mm. Head white, with an ochreous frontal bar marked with black. Forewings ochreous-whitish, strigulated with grey; lines greyish-ochreous, first angulated near costa, median irregular, second curved. Hindwings as forewings, but first line absent.

Britain to Ross, Ireland, common; N. and C. Europe, WC. and N. Asia; 5, 6. Larva pale green; on 5-12 sometimes a dorsal series of purple-red marks, including black white-edged spots; subdorsal line yellowish; a lateral series of purple-red or red-brown marks; incisions yellowish: on hazel, birch, etc.; 7-9.

19. OURAPTERYX, *Lch.*

Face subprominent, with short projecting hairs. Tongue developed. Antennae in ♂ shortly and evenly ciliated. Palpi rough-scaled. Thorax densely hairy beneath. Femora hairy; posterior tibiae in ♂ dilated. Forewings in ♂ without fovea; 10 absent, 11 anastomosing or connected with 12 and sometimes 9 also.

A small Indo-Malayan genus, containing one European species.

1. **O. sambucaria**, *L.* 42-54 mm. Head pale yellow, face ferruginous. Forewings pale yellow, thinly strigulated with pale grey; first and second lines yellow-grey, nearly straight; a yellow-grey linear discal mark. Hindwings with ground as in forewings; second line straight, yellow-grey, not reaching margins; termen angulated and strongly caudate in middle,

with a red black-edged subterminal spot above tail, and a black mark below it.

Britain to Dumfries, N. Ireland, rather common; C. Europe, WC. and N. Asia; 7. Larva pale brown, streaked with paler and darker; 7 with two prominences, 9 with one; 13 with two slender projections: on elder, hawthorn, etc.; 9-5.

20. Metrocampa, *Latr.*

Face smooth or with projecting scales. Tongue developed. Antennae in ♂ bipectinated, apex (sometimes only 2-3 joints) simple. Palpi rough-scaled. Thorax hairy beneath. Femora glabrous; posterior tibiae in ♂ sometimes dilated. Forewings in ♂ without fovea; 10 out of 9, occasionally obsolete at base and then apparently out of 11, 11 anastomosing or connected with 12 and nearly always with 10 also.

A genus of some extent, ranging throughout the Northern hemisphere but commonest in America.

1.	Fillet white	2.
	„ not white	3.
2.	Termen of hindwings dentate	2. *margaritaria.*
	„ „ not dentate	1. *prosapiaria.*
3.	First line of forewings defined	3. *pulveraria.*
	„ „ „ obsolete	4. *dolobraria.*

1. **M. prosapiaria**, *L.* (*fasciaria*, Schiff.; *prasinaria*, Hb.) 28-36 mm. Face dull brown-red, fillet white. Forewings pale dull reddish, sometimes dull green except costal edge; first line curved, second sinuate, whitish; included band slightly darker. Hindwings as forewings, but first line absent, second slightly curved; termen rounded.

Britain to Ross, Ireland, rather common; N. and C. Europe, N. Asia; 6, 7. Larva with prolegs on 9; purplish-brown; a connected dorsal series of brown-reddish blotches, pale-edged; rows of small reddish tubercles: on *Pinus sylvestris* and larch; 9-4.

2. **M. margaritaria**, *L.* 36-48 mm. Head white, face ferruginous. Forewings pale whitish-green, costal edge white; first and second lines nearly straight, white, edged with dull green on discal side; a dull red apical dot in cilia. Hindwings as in forewings, but no first line or apical dot; termen dentate in middle.

Britain to Ross, W. Ireland, common; C. Europe, N. America; 7. Larva with prolegs on 9; ashy-grey, or brownish-grey, sides ciliated; 8, 9 sometimes with pale blotch: on oak, beech, birch, etc.; 9-5.

3. **M. pulveraria**, *L.* 28-33 mm. Head brownish-ochreous. Forewings brownish-ochreous, strigulated with reddish-fuscous; first line hardly curved, second somewhat waved, strongly sinuate, dark reddish-brown, enclosed band suffused with ochreous-brown. Hindwings with ground as in forewings; second line indicated dorsally; termen rounded.

Britain to Ross, W. Ireland, rather common (unfrequent in Scotland); N. and C. Europe, N. Asia; 5, 6. Larva dull reddish-brown; an ochreous lateral line on 5 and 6; a prominence on 9, and two small ones on 10; head bifid: on *Salix*, hazel, etc.; 7, 8.

4. **M. dolobraria**, *L.* 31-34 mm. Head dark reddish-fuscous. Forewings whitish-ochreous, striated with ochreous-brown; basal third of costa dark reddish-fuscous; a purplish tornal suffusion, preceded by a dark fuscous dorsal transverse mark; termen roundly projecting in middle. Hindwings whitish-yellowish; a purplish tornal blotch, marked with two blackish streaks and some strigulae; termen as in forewings.

England, E. and S. Ireland, rather common; N. and C. Europe; 5, 6. Larva pale ochreous-brown, with a few darker streaks; 2-4 swollen, raised; a prominence on 9; head bifid: on oak, beech, etc.; 8, 9.

21. EUCHLAENA, *Hb.*

Face with appressed scales. Tongue developed. Antennae in ♂ bipectinated, apex simple. Palpi rough-scaled. Thorax hairy beneath. Femora glabrous; posterior tibiae in ♂ sometimes dilated. Forewings in ♂ without fovea; 10 sometimes connected with 9, 11 out of 10, anastomosing or connected with or sometimes running into 12.

The genus principally inhabits the Indo-Malayan region, and there are a few North American species, but no others in Europe; it is probably akin to *Ennomos*.

1. Discal mark transverse-linear . . 1 *prunaria*.
 „ „ dot-like . . . . 2.
2. Second line of forewings running to apex 3. *apiciaria*.
 „ „ „ „ costa 2. *parallelaria*.

1. **E. prunaria**, *L.* 37-46 mm. Head orange. Forewings orange, strigulated with dark fuscous, sometimes irregularly blotched or suffused with rather dark fuscous; a dark fuscous discal mark. Hindwings as forewings.

England to York, Arran, S. Ireland, rather common; N. and C. Europe, WC. and N. Asia, Japan; 6, 7. Larva pale grey, streaked with darker; 6-8 with a pale dorsal mark; 5 and 12 with pairs of small prominences; 9 with a quadrifid ridge, outer points larger: on *Salix*, blackthorn, etc.; 8-5.

2. **E. parallelaria**, *Schiff.* (*vespertaria*, Stph.) 23-26 mm. Head deep yellow, sides of face sometimes violet. Forewings orange-yellow, strigulated and in ♂ veined with ferruginous; lines metallic, dark purple-leaden, first much curved or angulated, continued on costa to base, second twice sinuate in ♂, deeply sinuate in middle in ♀, limiting a purplish or reddish-brown terminal band; a black discal dot. Hindwings as forewings, but first line absent, second less sinuate.

England to York, local; N. and C. Europe, N. Asia; 7, 8. Larva ashy-grey; dorsal line pale, darker-edged; subdorsal pale on 2-6; a dark mark on 6; some pale dorsal blotches on incisions: on *Salix caprea;* 5-7.

3. **E. apiciaria**, *Schiff.* 25-29 mm. Head orange. Forewings orange-yellow, strigulated and veined with ferruginous; first line metallic leaden and blackish, acutely angulated in middle, continued on costa to base; second black, sinuate, running to apex, limiting a purplish terminal band; a black discal dot. Hindwings as forewings, but first line absent, second running to costa.

Britain to Sutherland, N. Ireland, rather common; N. and C. Europe, N. Asia; 7-9. Larva ashy-grey, marked with darker and lighter; dorsal line pale, on 4 black, on 5-9 traversing pale diamonds; lateral pale on 4-10: on *Salix*, hazel, etc.; 6, 7.

22. Selenia, *Hb.*

Face with tuft of scales. Tongue developed. Antennae in ♂ bipectinated to apex. Palpi rough-scaled. Thorax densely hairy beneath. Femora densely hairy; posterior tibiae in ♂ not dilated. Forewings in ♂ without fovea; a transparent scar on transverse vein; 6 out of 9, 11 rarely connected with 12 or 10. Hindwings with a transparent scar on transverse vein; 6 and 7 stalked.

Includes only the following and two or three North American species.

1. Discal scar very obscure . . . 1. *bilunaria.*
,, ,, distinct . . . . 2.
2. Median and second lines costally approximated 2. *lunaria.*
,, ,, ,, parallel . 3. *tetralunaria.*

1. **S. bilunaria**, *Esp.* (*illunaria*, Hb.) 34-41 mm. Forewings whitish-ochreous, sprinkled with grey or black, often strigulated

with purplish-brown; costa more purple-whitish, its base yellow mixed with ferruginous; first line curved, second straight, subparallel, dark fuscous, stronger on costa; median slightly angulated, fuscous or dark ferruginous; subterminal whitish near costa, limiting ferruginous or ochreous apical patch; termen projecting in middle. Hindwings with ground as in forewings; median and second lines indistinct or obsolete, straight, adjacent; termen dentate.

Britain to Caledonian Canal, N. Ireland, common; N. and C. Europe, N. Asia; 3, 4, 7. Larva ochreous-brown or purplish-brown, marked with yellowish; subdorsal line pale ochreous; 8 and 9 with pairs of red projections in ochreous marks; 13 with two projections: on blackthorn, hawthorn, etc.; 5, 6, 8, 9.

2. **S. lunaria,** *Schiff.* 38-42 mm. Differs from *S. bilunaria* as follows: first and second lines of forewings not stronger on costa, first more curved, second closely approximated to median towards costa, enclosed narrow space ochreous or reddish-ochreous, discal scar distinct: hindwings with median and second lines as in forewings, discal scar blackish-edged.

Britain to Ross, N. Ireland, rather common; C. Europe; 6. Larva ochreous-brown, darker-marked; subdorsal line pale; 5 with four projections, outer larger; 6 with a bifid prominence, white-edged in front; 9 and 10 with pairs of projections: on blackthorn, oak, etc.; 7, 8.

3. **S. tetralunaria,** *Hufn.* (*illustraria*, Hb.) 32-44 mm. Differs from *S. bilunaria* as follows: ground more brownish, sometimes suffused with dark purplish-fuscous, part of costa and a band beyond second line whitish-purple or whitish; first line more curved, second subsinuate, discal scar clear white; median and second lines in hindwings rather remote.

England to Cheshire, Perth, not common; C. Europe; 5, 8. Larva pale ochreous-brown, darker-marked; 5, 6 with pairs of small prominences; 8, 9 swollen, each with four prominences; a dull orange band between 8 and 9; 13 with two points: on hazel, birch, etc.; 6, 9, 10.

23. HYGROCHROA, *Hb.*

Face with tuft of scales. Tongue developed. Antennae in ♂ bipectinated to apex. Palpi rough-scaled. Thorax densely hairy beneath. Femora densely hairy; posterior tibiae in ♂ not dilated. Forewings in ♂ without fovea; 10 sometimes out of 9, sometimes connected with 11.

There is but one species certainly referable here.

1. **H. syringaria**, *L.* 34-38 mm. Head light brownish. Forewings deep ochreous, suffused with deep yellow towards middle of termen; first and second lines whitish-purple, angulated, dilated on costa, second black towards middle; median ferruginous or partly black, sharply angulated; subterminal whitish-purple towards costa; termen somewhat projecting on 6. Hindwings deep ochreous; median line ferruginous or blackish, straight; second purple-whitish, nearly straight, black-dotted on lower half; termen dentate.

England, rather common; N. and C. Europe, N. Asia; 7. Larva dark grey, marked with pale and dark brown; subdorsal line double, pale ochreous, interrupted; 6, 7 with pairs of projections; 8 with two long horns curved backwards; head brown: on ash, *Ligustrum*, *Lonicera*; 9-6.

24. Cepphis, *Hb.*

Face loosely scaled. Tongue developed. Antennae in ♂ bipectinated to apex. Palpi rough-scaled. Thorax hairy beneath. Femora glabrous; posterior tibiae in ♂ not dilated. Forewings in ♂ without fovea; 7 and 8 unusually short, 7 rising above middle of 9, 10 out of 9.

There is only one species; it is correlated to the two preceding genera.

1. **C. advenaria**, *Hb.* 26-29 mm. Head whitish-yellow, mixed with fuscous. Forewings ochreous-whitish, much sprinkled with fuscous; costa yellowish; first line curved, second sinuate or subangulated, fuscous; praesubterminal suffusedly darker; a fuscous discal mark. Hindwings as forewings, but first line absent, discal dot blackish.

S. England to Stafford and Cambridge, local; C. Europe, WC. and N. Asia, Japan; 6. Larva dark brown, marked with pale ochreous; a double series of black spots; 5-8 with pale heart-shaped blotches: on *Salix*, *Vaccinium*, *Rubus*; 7, 8.

25. Colotois, *Hb.*

Face roughly hairy, with a tuft from beneath antennae across eye to middle. Tongue short. Antennae in ♂ very strongly bipectinated to apex. Palpi very short, rough-haired. Thorax densely hairy above and beneath. Femora densely hairy; posterior tibiae in ♂ not dilated, spurs short. Forewings in ♂ without fovea; 10 sometimes anastomosing or connected with 9, 11 anastomosing or connected with 12 and 10.

Also confined to a single species.

1. **C. pennaria**, *L.* 38-46 mm. Head reddish-ochreous. Forewings reddish-ochreous sprinkled with fuscous; first line somewhat curved, second nearly straight, dark fuscous; a dark fuscous discal dot; a very small whitish or dark grey subapical spot. Hindwings as in forewings, but paler basally, no first line or subapical spot, praesubterminal sometimes fuscous, curved.

Britain to Ross, N. Ireland, common; C. Europe, WC. and N. Asia; 10, 11. Larva pale grey or reddish-brown, darker-marked; 3-11 sometimes with pale diamonds, and series of pale yellow dots; 12 with two reddish projections; head reddish-brown: on oak, beech, etc.; 5, 6.

26. ENNOMOS, *Tr.*

Face with dense projecting scales. Tongue developed or rudimentary. Antennae in ♂ bipectinated to apex. Palpi rough-scaled. Thorax densely hairy above and beneath. Femora densely hairy; posterior tibiae with middle-spurs very short or absent, in ♂ not dilated. Forewings in ♂ without fovea; 6 sometimes out of 9, 10 rarely out of 9, sometimes anastomosing or connected with 9, 11 often out of 10, anastomosing or connected with 12 and sometimes with 10 also, rarely running into 12 or absent. Hindwings: 6 and 7 rarely stalked.

A characteristically European genus of limited size, straggling into North America. In all the species the termen of both forewings and hindwings forms a triangular projection on vein 4.

1.	Posterior tibiae with middle-spurs	2.
	,, ,, without middle-spurs	3.
2.	Head orange	5. *autumnaria*.
	,, pale ochreous	4. *quercinaria*.
3.	Head and thorax clear yellow	3. *alniaria*.
	,, ,, ochreous	4.
4.	Terminal area of forewings pale fuscous	2. *fuscantaria*.
	,, ,, ,, not fuscous	1. *erosaria*.

1. **E. erosaria**, *Bkh.* 35-38 mm. Head orange-ochreous. Posterior tibiae without middle-spurs. Forewings ochreous; first line curved, second hardly curved, fuscous. Hindwings ochreous.

England, Renfrew, E. Ireland, rather common; C. Europe; 8, 9. Larva pale ochreous, brown-marked; 3, 6, 9, 12 with rather large prominences, 8 with a small one, 7 with two: on oak and birch; 6, 7.

2. **E. fuscantaria**, *Hw.* 33-38 mm. Head light ochreous or brownish. Posterior tibiae without middle-spurs. Forewings ochreous; first and second lines hardly curved, fuscous, approximated or meeting dorsally; terminal area beyond second suffused with pale fuscous; a faint fuscous discal mark. Hindwings dull ochreous.

England, rather common; N. France to Prussia; 8, 9. Larva pale yellowish-green, white-sprinkled; spiracular line conspicuously paler; 7 and 13 with pairs of small tubercles: on ash; 6, 7.

3. **E. alniaria**, *L.* (*tiliaria*, Bkh.) 34-37 mm. Head and thorax clear yellow. Posterior tibiae without middle-spurs. Forewings yellow-ochreous strigulated with fuscous; first and second lines curved, dark fuscous; a dark fuscous discal mark. Hindwings yellow-ochreous, posteriorly strigulated with dark fuscous; median line straight, grey, often faint; a grey discal spot touching it.

Britain to Caledonian Canal, common; C. Europe; 8, 9. Larva pale brown; 6, 9 with transverse ridges; 7, 8, 12 with pairs of small tubercles; 13 with two points: on oak, birch, etc.; 6, 7.

4. **E. quercinaria**, *Hufn.* (*angularia*, Bkh.) 35-43 mm. Head pale ochreous. Posterior tibiae with middle-spurs. Forewings light ochreous, sometimes partially reddish-ochreous, strigulated with dark fuscous; first and second lines curved, dark fuscous, second sometimes followed by a fuscous suffusion; a fuscous discal dot. Hindwings pale ochreous, more reddish-ochreous posteriorly; median line curved, grey, indistinct; sometimes a discal dot on it.

England to York, Lanark, common; C. Europe; 8-10. Larva ashy-grey, dark-marked; subdorsal line pale on 2-6; 6 with three yellowish-tipped projections, central largest, 8, 10 with four each, 12 with two: on beech, birch, etc.; 5-8.

5. **E. autumnaria**, *Wernb.* (*alniaria*, Esp.) 42-48 mm. Head orange. Posterior tibiae with middle-spurs. Forewings light orange-ochreous, deeper towards apex, coarsely strigulated with dark grey; first and second lines thick, curved, dark grey; a dark grey discal spot. Hindwings pale orange-ochreous, deeper terminally, sometimes partly strigulated with dark grey.

Kent to Devon, York, scarce, hardly native; N. and C. Europe; 8, 9. Larva light brown, marked with darker and paler (rarely green, white-sprinkled); subdorsal line pale ochreous; a dark blotch on 5; 6 with transverse prominence and two tubercles, 7 and 12 with pairs of tubercles, 9 with a prominence: on sycamore, birch, etc.; 7, 8.

27. Gonodontis, *Hb.*

Face with dense projecting scales. Tongue developed or obsolete. Antennae in ♂ bipectinated to apex. Palpi rough-scaled. Thorax densely hairy above and beneath, tending to be slightly crested anteriorly. Femora densely hairy; posterior tibiae in ♂ not dilated. Forewings in ♂ without fovea; 10 often connected or anastomosing with 9, occasionally with 11.

Includes only a few European species; it is derived from the ancestral *Prosopolopha* group.

Termen of forewings strongly dentate .	1. *bidentata.*
,, ,, not strongly dentate .	2. *elinguaria.*

1. **G. bidentata,** *Cl.* 40-48 mm. Head light fuscous. Forewings brown, strigulated with blackish; first and second lines nearly straight, serrate, blackish-grey, marked with whitish dots; praesubterminal sometimes suffusedly darker; a grey black-edged discal spot; termen strongly and irregularly dentate. Hindwings as forewings, but paler, first line absent, termen not dentate.

Britain to the Hebrides, Ireland, common; N. and C. Europe, N. Asia; 5, 6. Larva with rudimentary prolegs on 8 and 9; ashy-grey or brown, sometimes with darker dorsal diamonds or lateral line; or blackish, irregularly marked with pale green; a semicircular plate on 12: on hazel, birch, etc.; 7-9.

2. **G. elinguaria,** *L.* 34-37 mm. Head whitish-ochreous. Forewings whitish-ochreous, sometimes sprinkled with dark fuscous; first line nearly straight, second sinuate, dark fuscous, included space usually light brown; a blackish sometimes pale-centred discal spot; termen waved. Hindwings whitish-ochreous; a dark fuscous discal dot; sometimes an indistinct curved fuscous median line.

Britain to Sutherland, N. and W. Ireland, common; N. and C. Europe, WC. and N. Asia; 7, 8. Larva ochreous-brown or pale ochreous, darker-marked; dorsal line greyish, expanded on incisions, partially edged with dark fuscous and marked with small V-shaped marks: a semicircular plate on 12: on hazel, blackthorn, etc.; 5, 6.

6. POLYPLOCIDAE.

Head densely rough-haired. Ocelli present. Tongue developed. Labial palpi moderately long, subascending, rough-scaled, terminal joint cylindrical. Thorax densely hairy beneath. Femora and tibiae densely hairy, spurs rather short. Forewings: 1b sometimes simple, 10 connected by bar with 9. Hindwings: 5 fully developed, 6 from angle, 7 from upper margin at $\frac{3}{4}$, 8 closely approximated to 7 beyond cell.

Only a small group, nor is there any evidence that it has ever been much more extensive; it is mainly restricted to the northern hemisphere. The imagos have mostly stout bodies and elongate-triangular forewings, and have some superficial resemblance in form with the *Caradrinidae*, with which however there is absolutely no relationship. The similarity of the neuration of the hindwings to that of some *Lasiocampina* is probably reversional.

Ovum spheroidal above, flattened beneath, surface finely reticulated and sometimes ribbed. Larva moderately stout, with all prolegs developed. Pupa in a rather slight cocoon usually amongst leaves.

Occasionally in the forewings, by obsolescence of a small connecting portion of the vein, 9 appears to rise out of 10 and have no connection with 8; or possibly this may be its true original structure.

The phylogeny of the genera, which are all nearly related together, is probably fairly indicated by the arrangement.

TABULATION OF GENERA.

1. Eyes hairy . . . . 4. POLYPLOCA.
,, glabrous . . . . . 2.
2. Hindwings with 5 parallel to 4 . 3. PALIMPSESTIS.
,, ,, approximated to 4 at base . 3.
3. Antennae in ♂ ciliated with fascicles . 2. THYATIRA.
,, ,, simple . . . 1. HABROSYNE.

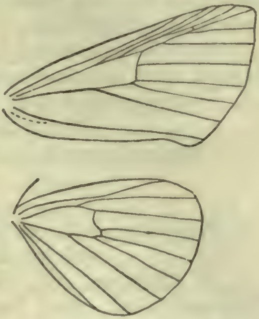
1. HABROSYNE, *Hb.*

Eyes glabrous. Antennae in ♂ filiform, simple. Thorax transversely crested. Abdomen with small dorsal crest. Forewings: 6 out of 9. Hindwings: 5 approximated to 4 at base.

A small genus, distributed throughout the northern hemisphere.

1. **H. derasa**, *L.* 35-39 mm. Forewings light brown; an oblique white raised streak in disc near base; a white streak from ¼ of costa to ⅔ of dorsum, followed by a ferruginous fascia blackish-striated on costa; an elongate white patch along median portion of costa, marked in middle with three ferruginous lines, and edged with ferruginous suffusion; orbicular and discal spots outlined with dark ferruginous; second line quadruple, strongly dentate, dark fuscous, visible in disc only; a white subterminal streak from apex to tornus. Hindwings fuscous, darker posteriorly.

Britain to the Clyde, Ireland, common; C. Europe, WC. and N. Asia; 7. Larva reddish-brown, sides more ochreous; a lateral series of indistinct oblique darker marks; a white lateral spot on 4, sometimes also on 5 and 6; head brown: on *Rubus fruticosus*; 8, 9.



Neuration of *Habrosyne derasa.*

2. Thyatira, *O.*

Eyes glabrous. Antennae in ♂ ciliated with fascicles. Abdomen with small dorsal crest. Forewings: 6 separate. Hindwings: 5 approximated to 4 at base.

Includes only the single species, unless some allied Indian forms are associated with it. In repose the larva commonly raises both extremities from the surface on which it is resting.

1. **T. batis**, *L.* 35-37 mm. Forewings rather dark fuscous; five rounded whitish blotches, suffused with pink except edges, first largest, basal, marked with brown spots, second smallest, dorsal, brownish in middle, third tornal, enclosing a brown spot, fourth on costa at ⅔, fifth apical; a white terminal mark above third. Hindwings fuscous, darker posteriorly.

Britain to Ross, Ireland, common; N. and C. Europe, WC. and N. Asia, India, Java; 6, 7. Larva pinkish-brown, darker-mixed, white-dotted; sometimes a lateral series of oblique darker marks; spiracular line dark brown; 3 with large bifid prominence; 6-10 with conical prominences; 5 with three blackish dorsal spots; head ochreous, brown-marked: on *Rubus*; 8, 9. The imago probably imitates a group of fallen petals of the bramble.

3. Palimpsestis, *Hb.*

Eyes glabrous. Antennae in ♂ very shortly ciliated. Terminal joint of palpi short. Abdomen not crested. Forewings: 6 out of 9. Hindwings: 5 nearly parallel to 4.

A small European and Asiatic genus. Larva living concealed amongst spun leaves of trees.

1. Forewings with pale orbicular and discal spots . 2.
„ without pale orbicular and discal spots 3.
2. First and second lines diverging towards costa . 3. *or.*
„ „ „ parallel towards costa 4. *octogesima.*
3. Forewings with two black discal dots . 2. *duplaris.*
„ without discal dots . . 1. *fluctuosa.*

1. **P. fluctuosa**, *Hb.* 33-36 mm. Forewings light fuscous, white-sprinkled; first line whitish, limiting a broad darker central band including dark fuscous median and second lines, followed by a whitish dark-edged waved line; subterminal whitish, waved, preceded on costa by an oblique dark fuscous dash. Hindwings grey, with a pale postmedian line.

England, S. Ireland, local; C. Europe; 6, 7. Larva yellow-whitish; dorsal, fine subdorsal, and lateral lines fuscous; head reddish-ochreous, brown-marked: amongst spun leaves of birch and oak; 9, 10.

2. **P. duplaris**, *L.* 27-32 mm. Differs from *P. fluctuosa* as follows: forewings with whitish lines usually less distinct, central band usually dark-striated towards edges, two black discal dots transversely placed, no praesubterminal dash, a dark fuscous oblique apical dash.

Britain to Sutherland, Ireland, common; N. and C. Europe, NW. Asia; 6, 7. Larva pale dull greenish, deeper dorsally; dorsal line darker; subdorsal broad, dull olive-green; lateral fine, yellowish; dots black; head reddish: amongst joined leaves of birch, alder, and oak; 8, 9.

3. **P. or**, *F.* 35-38 mm. Forewings brownish-grey; subbasal line double, dark fuscous; first and second lines quadruple, dark fuscous, sometimes suffused, markedly diverging towards costa; small orbicular and 8-shaped discal spots pale or whitish; subterminal formed of short whitish marks followed by black marks; an oblique black apical dash. Hindwings rather dark grey.

Britain to the Hebrides, local; N. and C. Europe, N. Asia; 6, 7. Larva pale greenish; dorsal line darker; spiracular faintly yellowish; head reddish-ochreous: between joined leaves of poplar; 8, 9.

4. **P. octogesima**, *Hb.* (*ocularis*, Gn.) 32-34 mm. Forewings light ochreous-grey, more brownish basally; subbasal line double, grey; a dark fuscous stria before first line, marked with a small blackish spot in disc; first and second lines double, inner stria black, outer dark fuscous, parallel towards costa; median dark grey; whitish 0-shaped orbicular and 8-shaped discal spots; a dark stria beyond second line; subterminal obscurely whitish; an oblique black apical dash. Hindwings grey, with a pale postmedian fascia.

S. England to Hereford and Norfolk, local; N. and C. Europe, WC. and N. Asia; 6. Larva pale yellowish, greenish-tinged; one lateral black spot on 4 and 12, two on 3, three on 2; head orange-ochreous, black-marked: between joined leaves of poplar; 7-9.

4. Polyploca, *Hb.*

Eyes hairy. Antennae in ♂ very shortly ciliated. Terminal joint of palpi moderate. Abdomen sometimes with small dorsal crest. Forewings: 6 out of 9. Hindwings: 5 approximated to 4 at base.

Apparently restricted to a very few European species. Larva living concealed amongst spun leaves of trees.

1. First line of forewings white . . 3. *ridens.*
„ „ „ not white . . . 2.
2. Forewings with two ochreous-brown fasciae 1. *diluta.*
„ without ochreous-brown fasciae 2. *flavicornis.*

1. **P. diluta**, *F.* 30-33 mm. Forewings light greyish-ochreous, more brownish towards base, costa pink-tinged, with indistinct fuscous striae; first and second lines forming ochreous-brown bisinuate dark-striated fasciae, dark fuscous towards costa and on inner edge. Hindwings ochreous-grey-whitish; a grey median fascia and terminal band.

England, Lanark, S. Ireland, rather common; C. Europe; 8, 9. Larva pale yellowish, becoming greyer laterally; dorsal line grey; spiracular pale yellow; dots black; head fuscous: between spun leaves of birch and oak: 6, 7.

2. **P. flavicornis**, *L.* 37-39 mm. Forewings grey or dark grey, slightly yellowish-tinged, suffused with whitish-ochreous towards middle of costa, with some indistinct darker striae; first line formed by two or three and second by two dark grey or partly black striae, diverging towards costa; a rather large

pale orbicular spot and indistinct dark-edged discal mark; an oblique dark grey apical dash. Hindwings light grey; two darker postmedian lines; a dark grey terminal fascia.

Britain to Ross, Ireland, rather common; N. and C. Europe, 3. Larva light green, or slaty-grey; subdorsal and spiracular series of black spots; dots white; head reddish-ochreous: amongst spun leaves of birch; 5-7.

3. **P. ridens**, *F.* 34-37 mm. Forewings rather dark fuscous, greenish-tinged and partially sprinkled with greenish-whitish; a white suffusion towards base of costa; subbasal line blackish; first and second lines white, waved, blackish-edged, first followed and second preceded by a parallel black stria; indistinct paler dark-edged orbicular and discal spots; veins posteriorly partly black-marked; a terminal series of white black-edged crescentic marks. Hindwings whitish, posteriorly suffused with rather dark fuscous.

England, local; C. and SW. Europe; 3, 4. Larva yellow; dorsal and spiracular lines green; subdorsal green, usually interrupted; lateral and subspiracular series of small black spots; dots white; head orange-ochreous: amongst spun leaves of oak; 6, 7.

7. SPHINGIDAE.

Head with dense appressed hairs. Ocelli absent. Eyes glabrous. Antennae thickened towards middle or posteriorly, in ♂ ciliated with partial whorls. Labial palpi moderate, ascending, with dense projecting scales. Thorax densely hairy beneath. Femora densely hairy. Forewings: 1b furcate, 6 out of 8, 9 absent (rarely present in exceptional individuals). Hindwings: 3 and 4 approximated at base, 5 from middle of transverse vein, parallel to 4, 6 and 7 connate or stalked, 8 connected by oblique bar with margin of cell before middle, more or less approximated to 7 near beyond cell.

This is a numerous family, distributed throughout the principal regions except in New Zealand (where there is only one not truly indigenous species), but more plentifully within the tropics. The imagos are usually large insects, with stout heavy bodies, elongate-triangular forewings with very oblique termen, and relatively small hindwings; the wing-muscles are very strong, and the flight exceptionally powerful.

Ovum spheroidal, smooth. Larva stout, usually with an oblique projecting anal horn, anterior segments sometimes retractile or raised in repose. Pupa subterranean.

The phylogeny is sufficiently simple; the group of *Smerinthus* and *Dilina* is of primitive character, and some exotic members of it closely approach the *Notodontidae;* the other genera constitute a more largely developed line of descent originating in this group.

Tabulation of Genera.

1.	Abdomen with broad expansible anal tuft .	2.
	„ without expansible anal tuft . .	3.
2.	Abdomen hairy, wings partly transparent	1. Hemaris.
	„ smooth, wings opaque .	2. Macroglossa.
3.	Posterior tibiae without middle-spurs	6. Smerinthus.
	„ „ with middle spurs . .	4.
4.	Abdomen conical, pointed . . .	5.
	„ obtuse . . .	5. Acherontia.
5.	Antennae thickest near apex . . .	6.
	„ „ about middle . .	7. Dilina.
6.	Thorax with short double posterior tuft .	4. Sphinx.
	„ smooth	3. Deilephila.

1. Hemaris, *Dalm.*

Tongue strongly developed. Antennae over ½, gradually thickened to near apex, then pointed, apex slender, hooked. Abdomen broad, hairy, with broad truncate expansible anal tuft. Tibiae densely hairy. Wings with disc transparent.

A moderate genus, distributed throughout the northern hemisphere, but mainly American and Asiatic. Imago day-flying, feeding on the wing; immediately after emergence the wings are furnished with very fugitive scales.

Hindwings with a blackish terminal line	1. *bombyliformis.*
„ „ dark red-brown terminal fascia	2. *fuciformis.*

1. **H. bombyliformis,** *Esp.* 38-42 mm. Abdomen ochreous-yellowish, apex and a central band blackish. Forewings transparent, veins blackish; costa and a basal patch dorsally prolonged to beyond middle blackish mixed with ochreous-yellowish; a blackish terminal fascia, becoming very narrow towards tornus. Hindwings transparent, veins blackish; base and a dorsal band blackish mixed with ochreous-yellowish; a linear blackish terminal border.

Britain to the Clyde, Aberdeen, Ireland, rather common; Europe, WC. Asia; 5, 6. Larva green, yellowish-dotted; 5-12 with subdorsal and spiracular series of dark reddish or brown marks; spiracles white; horn reddish: on *Scabiosa;* 7, 8.

2. **H. fuciformis**, *L.* 42-48 mm. Differs from *H. bombyliformis* as follows: central band of abdomen dark red-brown; forewings with a dark red-brown discal mark, terminal fascia rather broad, moderately narrowed beneath; hindwings with a moderate dark red-brown terminal fascia.

Britain to Sutherland, rather common; Europe, WC. Asia; 5, 6. Larva green, yellowish-dotted; lateral line yellowish; 5-12 with brown-red spiracular dots or marks, and whitish adjacent dots; horn red-brown: on *Lonicera;* 7, 8.

2. MACROGLOSSA, *Sc.*

Tongue strongly developed. Antennae over ½, gradually thickened to near apex, then pointed, apex slender, hooked. Abdomen broad, smooth, with broad truncate expansible anal tuft, last three segments with expansible lateral tufts. Tibiae hairy. Wings wholly scaled.

A genus of some extent, nearly cosmopolitan. Imago day-flying, feeding on the wing.

1. **M. stellatarum**, *L.* 45-51 mm. Abdomen fuscous, with white median and black posterior lateral spots, tufts black. Forewings fuscous, with indistinct darker striae; first and second lines black, second angulated above middle, indistinct beneath; a black discal dot. Hindwings deep orange; base fuscous; a red-brown terminal fascia, narrowed and not reaching tornus; termen dark fuscous.

Britain to the Orkneys, Ireland, common, uncertain in appearance; Europe, N. and C. Asia, N. Africa; 9-5. Larva varying from green to brown, white-dotted; dorsal line darker; lateral whitish; subspiracular yellowish; horn bluish, tip yellowish: on *Galium;* 7-9.

3. DEILEPHILA, *O.*

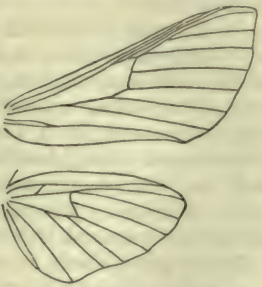
Tongue strongly developed. Antennae less than ½, gradually thickened to near apex, then pointed, apex slender, hooked. Abdomen smooth, broad, conical, pointed. Tibiae with appressed scales.

The genus is large and nearly cosmopolitan, but especially in warm regions. Imago flying at dusk, feeding on the wing. Most of the species occurring in Britain are probably only occasional immigrants, which under favourable circumstances breed here and establish themselves for a year or two.

1. Basal area of hindwings black . . 2.
„ „ „ not black . . 6.

2. Disc of hindwings rosy . . . . 3.
,, ,, yellow-ochreous . 1. *porcellus.*
3. Hindwings with black subterminal fascia . . 4.
,, without such fascia . . 2. *elpenor.*
4. Forewings with anterior edge of pale band straight 5. *lineata.*
,, ,, ,, ,, irregular 5.
5. Edge of dark postmedian band reaching middle of dorsum . 6. *euphorbiae.*
,, ,, ,, ,, reaching dorsum before middle 7. *galii.*
6. Forewings light brown . . . 3. *celerio.*
,, olive-green . . . 4. *nerii.*

1. **D. porcellus**, *L.* 44-52 mm. Forewings deep yellow-ochreous, more brownish towards base and costa; first, median, and second lines brownish; costa broadly suffused with purple-rosy towards middle; sometimes a rosy-whitish discal mark; an irregular dull rosy-purplish terminal fascia. Hindwings deep yellow-ochreous, costal and basal areas broadly blackish; terminal fascia as in forewings; termen waved.


Neuration of *Deilephila porcellus.*

Britain to Caledonian Canal, N. Ireland, common; Europe, WC. and N. Asia; 5, 6. Larva brown or green, blackish-freckled; 2-6 pinky-whitish above; 2 and 3 retractile into 4; 5 and 6 swollen, with round lilac brown-centred blackish-edged lateral spots; no anal horn, but a slight tubercle: on *Galium*; 7, 8.

2. **D. elpenor**, *L.* 58-66 mm. Forewings deep olive-ochreous; second line darker; costa rosy; dorsal edge white, near base blackish; lower half of median band purplish-rosy; sometimes a white discal dot; a straight streak from beyond middle of dorsum to costa before apex, and a terminal fascia light rosy-purple. Hindwings rosy, basal half black; cilia white.

Britain to Caledonian Canal, N. and E. Ireland, common, infrequent in Scotland; Europe, WC. and N. Asia; 6. Larva brown or green, blackish-freckled except on 2-4; subdorsal line pale on 2-4; 2 and 3 retractile into 4; 5 and 6 swollen, with blackish lateral blotches enclosing reniform lilac brown-centred spots; horn short, black: on *Galium*, *Epilobium*, *Fuchsia*, etc.; 7, 8.

3. **D. celerio**, *L.* 74-80 mm. Forewings light brown, partly suffused with ochreous-brown, indistinctly streaked in disc with blackish and whitish; a black discal dot; a narrow pale dark-striated rather curved fascia from before middle of dorsum to apex, anterior edge and dorsal extremity white; a straight whitish subterminal streak, preceded and followed by blackish striae. Hindwings dull rosy, paler posteriorly; a transverse blackish median blotch; a terminal brown fascia, including a black streak, connected with blotch by black veins.

Britain to Caledonian Canal, N. Ireland, scarce, occasional immigrants only; WC. and S. Europe, S. Asia, Africa, Australia; 9, 10. Larva green or brown; subdorsal line paler; 2 and 3 retractile; 5 and 6 with black yellowish-dotted yellow-circled lateral spots, that on 5 larger; horn brown: on grape-vine; 8, 9.

4. **D. nerii**, *L.* 72-112 mm. Forewings deep olive-green; a pale ochreous basal spot with dark green centre; lines cloudy, triple, ochreous-whitish, first strongly curved, rosy-suffused towards dorsum, second strongly rounded-angulated, below angle obscured by a large purple-brownish blotch; median shade broad, straight, whitish-ochreous, rosy-suffused on lower half; an oblique ochreous-whitish apical streak, preceded by a pale suffusion. Hindwings purplish-fuscous, more greenish posteriorly; second line whitish-ochreous, sinuate, followed by a darker green shade.

Britain to Perth, a rare immigrant only; C. and S. Europe, Asia Minor to Syria, N. Africa; 9, 10. Larva green or yellowish; subdorsal line whitish; 2 and 3 retractile; 4 with dark pale-circled lateral spot; 6-12 white-dotted; horn orange: on *Nerium oleander;* 8, 9.

5. **D. lineata**, F. (*livornica*, Esp.) 82-86 mm. Forewings ochreous-brown, disc blackish-mixed, veins in disc white; sometimes a whitish discal spot containing a black dot; a nearly straight pale ochreous fascia from before middle of dorsum to apex; a light brown dark-edged terminal fascia. Hindwings light rosy, towards dorsum whitish; basal area black; a brown terminal streak, preceded by a black fascia.

Britain to Perth, E. Ireland, occasional, not a permanent resident; WC. and S. Europe, C. Asia, N. Africa; 8, 9. Larva dark green or black, irrorated with yellow, sometimes dark-banded; dorsal line yellow; subdorsal yellow, on 4-12 usually with a series of round yellow black-edged spots, marked with rosy or blackish; subspiracular whitish, sometimes rosy-spotted;

horn slightly curved, reddish; head reddish or blackish: on *Galium*, *Fuchsia*, *Rumex*, etc.; 6, 7.

6. **D. euphorbiae**, *L.* 58-64 mm. Forewings grey-brown; basal area dark olive-brown, dorsally blackish, edge strongly curved, base whitish; a large roundish dark olive-brown discal spot; a dark olive-brown fascia from apex, upper half slender, lower irregularly much dilated, anterior edge running to middle of dorsum, preceded in disc by a pale ochreous suffusion. Hindwings rosy, towards dorsum white; basal area black; a narrow black subterminal fascia.

England, Lanark, on coast sandhills, local and probably only an occasional resident; C. and S. Europe, N. Africa, WC. Asia to the Himalayas; 6. Larva bronzy-green or blackish-bronze, irrorated with yellow or white, usually black-banded; dorsal line red; subdorsal and lateral series of yellowish spots on the black bands, former sometimes connected by a reddish or yellowish line; subspiracular red or yellowish; horn red; head red, sometimes black-spotted: on *Euphorbia paralias* and *E. cyparissias*; 8, 9.

7. **D. galii**, *Rott.* 62-75 mm. Forewings dark olive-brown; base whitish, followed on dorsum by a blackish suffusion; a rather broad pale brownish fascia suffused with pale ochreous from immediately before apex to dorsum markedly before middle, anterior edge with three well-marked projections; a light brownish terminal fascia. Hindwings rosy, partly whitish-suffused, towards dorsum whitish; basal area black; a narrow brownish terminal fascia, preceded by a black fascia.

Britain to Caledonian Canal, E. Ireland, usually non-resident, but at rare intervals breeds here rather freely and generally; Europe, N. and C. Asia, N. America; 6, 7. Larva olive-green, pale brown, reddish-brown, or black, sometimes yellow-dotted; a subdorsal series of yellow black-edged spots, rarely obsolete; horn red; head reddish: on *Galium*; 8, 9.

4. SPHINX, *L.*

Characters of *Deilephila*, but thorax with low double posterior tuft.

A moderately large genus, ranging over the whole world, but principally characteristic of America. Imago flying at dusk, feeding on the wing.

1. Hindwings with transverse lines . . . 2.
   „ without transverse lines . 1. *pinastri.*
2. Hindwings rosy-tinged . . . 2. *ligustri.*
   „ not rosy-tinged . . . 3. *convolvuli.*

1. **S. pinastri**, *L.* 70-75 mm. Forewings dark grey, closely irrorated with white, and sprinkled with black; three or four black dashes in disc; median and second lines broad, darker, often very indistinct, strongly curved; sometimes a white discal dot; an oblique black apical line; cilia white, blackish-barred. Hindwings dark grey, more blackish-grey terminally; cilia as in forewings.

Kent to Edinburgh, a scarce casual only, but apparently naturalised in Suffolk; N. and C. Europe, N. America; 6, 7. Larva green; dorsal line red-brown, irregular, edged by whitish or yellowish lines; lateral white; spiracular series of white blotches, spiracles orange-red; subspiracular yellowish; horn black-dotted: on *Pinus abies* and *P. sylvestris;* 8, 9. This species is sometimes very destructive to pine-forests on the Continent.

2. **S. ligustri**, *L.* 90-110 mm. Forewings light brown, whitish-sprinkled; veins in disc finely black, with three stronger black interneural streaks; first, median, and second lines obscurely darker, angulated above middle; lower half of median band suffused with dark brown, connected by a narrower suffusion with an oblique black apical streak, above which is a whitish suffusion; three whitish subterminal striae, and a blackish line after first. Hindwings pale whitish-rosy, termen brownish; three black fasciae.

England, Lanark, common; C. and S. Europe, WC. and N. Asia; 6. Larva green; on 5-11 a series of oblique lateral stripes, white below and purple above; spiracles yellow; horn black, beneath yellow: on *Ligustrum*, ash, holly, etc.; 8, 9.

3. **S. convolvuli**, *L.* 95-118 mm. Forewings dark grey, whitish-sprinkled, with darker dentate striae; two black interneural streaks in disc; an irregular black oblique apical line. Hindwings grey, whitish-sprinkled, darker terminally; base, anterior and subterminal fasciae, and two cloudy subconfluent postmedian lines blackish.

Britain to the Shetlands, Ireland, uncommon, probably not usually resident; Europe, Asia, Africa, Australia, New Zealand, America (varying slightly geographically); 8, 9. Larva green or brown, lighter or darker, sometimes closely streaked or reticulated; often two dorsal blackish lines or series of spots; on 5-11 often a series of oblique lateral white, dark, or blackish stripes; sometimes a spiracular series of blackish spots; subspiracular line sometimes whitish; horn blackish or ferruginous; head usually ochreous or ferruginous: on *Convolvulus;* 7.

5. ACHERONTIA, *O.*

Tongue short. Antennae less than ½, gradually thickened to near apex, then pointed, apex slender, hooked. Abdomen broad, obtuse, densely haired. Tibiae with dense appressed hairs.

An Asiatic genus of few species, one of which ranges into Europe and Africa. The imago possesses the power of uttering a curious squeaking sound, and is said sometimes to invade bee-hives in pursuit of honey.

1. **A. atropos**, *L.* 102-132 mm. Thorax blackish, with a light ochreous blotch resembling a skull and crossbones. Forewings blackish, whitish-sprinkled, with waved black striae; margins of median band suffused with whitish-ochreous on costal half, posterior followed by a ferruginous suffusion; median and submedian ferruginous longitudinal streaks; a whitish discal dot; veins terminally ferruginous. Hindwings light ochreous-orange; veins posteriorly more or less black; a narrow postmedian and broader subterminal fascia black.

Britain to the Shetlands, Ireland, not common; Europe, C. Asia, Japan, N. Africa; 7, 9, 10. Larva green, purplish-speckled, or brownish, white-speckled; 2-4 sometimes whitish; on 5-11 a series of purple or dark brown oblique lateral stripes; spiracles black; horn curved downwards and then upwards, speckled with yellow-whitish: on potato and other *Solanaceae;* 7, 8.

6. SMERINTHUS, *Latr.*

Tongue short, imperfect. Antennae less than ½, stout, thickest towards middle, in ♂ deeply incised so as to form thick lamellae. Abdomen more or less stout, with appressed hairs or scales, in ♀ pointed. Tibiae with appressed scales, posterior pair without middle-spurs. Hindwings with frenulum sometimes rudimentary.

A small but nearly cosmopolitan genus.

Hindwings with large bluish eye-spot .	2. *ocellatus.*
,, without such spot . .	1. *populi.*

1. **S. populi**, *L.* 68-88 mm. Forewings brown, irrorated and partly suffused with ashy-whitish; veins pale ochreous; about six darker striae, posteriorly waved; lower part of median band, and upper part of termen suffusedly darker; a white discal spot; termen waved. Hindwings as forewings, but a large dull red dorsal blotch from base to near tornus; no discal spot.

Britain to Ross, Ireland, common; Europe, N. and WC.

Asia; 5, 6. Larva green, yellow-dotted; on 5-11 a series of yellow oblique lateral stripes; spiracles red; sometimes a subdorsal series of red spots; horn yellow: on poplar and *Salix;* 7-9.

2. **S. ocellatus**, *L.* 70-88 mm. Thorax with very dark brown central blotch. Forewings pale rosy-brownish, with cloudy brown striae; first line darker brown, angulated below middle; discal spot outlined with brown; lower half of median band, and a large terminal subapical blotch dark brown; termen somewhat prominent on 3. Hindwings rosy, posteriorly light ochreous-brownish; a round black blotch above tornus, enclosing a dark grey spot encircled with pale bluish.

England, common; Europe, N. and WC. Asia; 5, 6. Larva green, white-dotted; on 5-11 a series of white oblique lateral stripes; spiracles red-circled; sometimes a subdorsal series of red spots; horn light blue: on apple, *Salix*, and poplar; 7-9.

7. Dilina, *Dalm.*

Tongue short, imperfect. Antennae less than ½, stout, thickest towards middle, not lamellated. Abdomen stout, with appressed scales, pointed. Tibiae with appressed scales, all spurs present.

Besides the single European species there are perhaps one or two others in Asia.

1. **D. tiliae**, *L.* 66-75 mm. Forewings flesh-colour, greyish-tinged; two subbasal and second lines very obscurely greenish-grey; a dark olive-green central fascia, interrupted below middle, with strong posterior median projection; a yellowish-olive-green terminal band, including a whitish costal suffusion; termen irregularly excavated in middle and above tornus. Hindwings yellow-ochreous or dull greenish, disc greyer; basal area blackish-mixed; a cloudy blackish subterminal fascia.

England to York, common; Europe, N. Asia; 5, 6. Larva green, yellow-dotted; on 5-11 a series of yellow oblique lateral stripes, marked with red above; spiracles red; horn blue above, red and yellow beneath: on lime (*Tilia*) and elm; 7-9. The imago appears to have a protective resemblance to a pair of half-expanded lime-leaves.

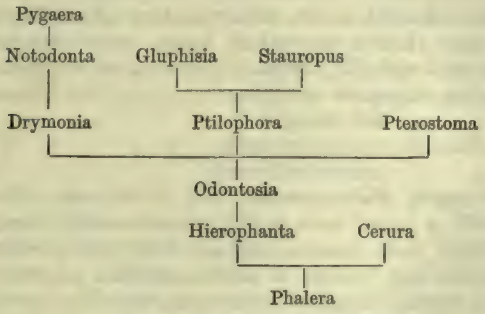
8. NOTODONTIDAE.

Head densely rough-haired. Ocelli present. Tongue usually developed. Thorax densely hairy beneath. Femora and tibiae densely hairy, spurs short. Forewings: 1b furcate. Hindwings: 3 and 4 closely approximated or connate, 5 weak, imperfect, from middle of transverse vein, parallel to 4, 6 and 7 connate or stalked, 8 connected with cell towards middle, diverging or approximated to end of cell.

A rather moderate family of pretty general distribution except in New Zealand. Imago with moderate or rather stout bodies, forewings rather elongate-triangular; the species are all strictly nocturnal in habit, and comparatively seldom met with except in the larval stage.

Ovum rounded or obtusely subconical above, flattish beneath, surface smooth or minutely pitted. Larva moderately stout, sometimes without prolegs on 13. Pupa usually subterranean.

Phylogeny of Notodontidae.



Tabulation of Genera.

1. Forewings with 10 rising separate, connected with 9 2.
,, ,, out of 9, not otherwise connected . . . 6.
2. Palpi very long . . . 7. Pterostoma.
,, rather short . . . . 3.
3. Posterior tibiae without middle-spurs . 10. Cerura.
,, ,, with middle-spurs . . 4.
4. Antennae in ♂ bipectinated . 9. Hierophanta.
,, ,, not pectinated . . . 5.
5. Forewings with strong dorsal scale-tooth 8. Odontosia.
,, without dorsal scale-tooth . 11. Phalera.
6. Eyes hairy, at least in part . . . 7.
,, glabrous . . . . . 8.

7. Forewings with dorsal scale-tooth . 2. Notodonta.
,, without dorsal scale-tooth 1. Pygaera.
8. Posterior tibiae without middle-spurs . . 9.
,, ,, with middle-spurs . 3. Drymonia.
9. Antennae of ♂ bipectinated to apex . . 10.
,, ,, with apical ⅓ simple . 5. Stauropus.
10. Antennal pectinations of ♂ very long 6. Ptilophora.
,, ,, ,, short . 4. Gluphisia.

1. Pygaera, *O.*

Eyes hairy. Antennae in ♂ bipectinated to apex. Palpi rather short, rough-haired. Thorax more or less crested in centre and posteriorly. Anal tuft of ♂ very elongate. Anterior tarsi rough-scaled. Forewings: 10 out of 9 above 7. Hindwings: 5 obsolete, 8 approximated to beyond middle of cell.

A rather limited genus, occurring throughout the Northern hemisphere. Larva somewhat hairy, with prominences or tubercles on 5 and 12. Pupa in a cocoon between leaves.

1. Median line quite straight . . 2. *anachoreta.*
,, ,, not straight . . . . . 2.
2. Median line curved inwards . . 3. *curtula.*
,, ,, curved outwards . . 1. *pigra.*

1. **P. pigra,** *Hufn.* (*reclusa,* F.) 22-26 mm. Crown and thorax with a broad dark reddish-brown central band. Forewings rather dark fuscous suffused with pale purplish; lines fine, whitish, first broken in middle, median angularly curved outwards, second angulated near costa, enlarged on costa, preceded by a dark fascia not reaching dorsum, and followed by a brown-red costal blotch; postsubterminal interrupted, blackish. Hindwings dark grey.

Britain to Sutherland, N. and W. Ireland, rather local; N. and C. Europe, Asia Minor; 5, 8. Larva with a few short hairs, pinkish-grey; 3, 4, 6 more yellowish above; 5 and 12 with pairs of black tubercles; lateral line darker grey; spiracular pinkish-ochreous; head black: on *Salix,* especially *S. repens;* 6, 7, 9.

2. **P. anachoreta,** *Hb.* 28-33 mm. Crown and thorax to middle with a strong dark fuscous central streak. Forewings fuscous, partially suffused with brown-whitish; lines fine, whitish, first and median straight, oblique, parallel, second twice sinuate, whiter and slightly interrupted on upper half, intersecting a large trapezoidal darker brown apical blotch,

darkest towards disc, somewhat reddish beyond second line; two blackish spots above tornus, lower very small. Hindwings grey.

Perhaps introduced, but temporarily naturalised in Kent and Norfolk; C. Europe, WC. and N. Asia; 5, 8. Larva rather hairy, dark fuscous; dorsal area with four ochreous or whitish lines; 5 and 12 with reddish-brown or black prominences, former with a snow-white spot on each side; series of orange spots or markings above and below spiracles; head black: on poplar; 7, 9, 10.

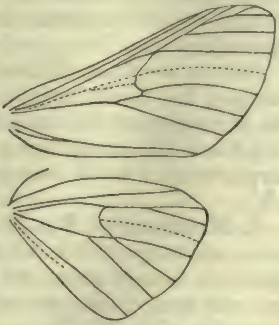
3. **P. curtula**, *L.* 31-34 mm. Crown and thorax to middle with a dark reddish-brown central blotch. Forewings brown, partially suffused with grey-whitish; lines fine, whitish, first straight, oblique, median somewhat curved inwards, second slightly sinuate above, stronger on costa, limiting a large trapezoidal reddish-brown apical blotch, deeper red anteriorly; postsubterminal interrupted, dark fuscous. Hindwings grey.

England, Fife, N. Ireland, local; N. and C. Europe, Asia Minor; 4, 5, 7. Larva hairy, pinkish-grey, black-speckled; 5 and 12 with black prominences; series of orange spots; head black, with two reddish-ochreous stripes: on aspen and poplar; 5, 6, 8, 9.

2. NOTODONTA, *O.*

Eyes hairy, at least in part. Antennae in ♂ bipectinated to near apex. Palpi rather short, rough-haired. Thorax with slight anterior crest. Anterior tarsi rough-scaled. Forewings with dorsal scale-tooth; 10 out of 9 above 7. Hindwings: 8 approximated to beyond middle of cell.

Also of no great extent; it ranges throughout the Northern hemisphere, but principally in temperate regions. Larva with two or more median prominences, and one on 12; anal prolegs small, held aloft in repose.



Neuration of *Notodonta ziczac.*

1. Discal mark of forewings strongly curved 1. *ziczac.*
„ „ „ not or hardly curved . 2.
2. Hindwings whitish . . . 3. *tritophus.*
„ grey . . . . . 3.

3. Base of costa with a pale blotch . 2. *dromedarius.*
,, ,, without pale blotch . 4. *torva.*

1. **N. ziczac**, *L.* 38-44 mm. Forewings light ochreous-brown, veins partly dark fuscous; median space white-sprinkled on upper half; subbasal, first, and second lines darker ochreous-brown on upper half, obsolete beneath; subterminal pale, darker-edged; a long crescentic discal mark, costa posteriorly, and a subcostal praesubterminal dash very dark ochreous-brown; some fuscous suffusion beyond discal mark; dorsal edge dark fuscous. Hindwings whitish-fuscous; a fuscous discal crescent.

Britain to Ross, Ireland, common; N., C., and SW. Europe; 5, 6, 8. Larva variable, pale ochreous, sometimes pinkish-tinged, or purplish-grey; strong prominences on 6, 7, and 12; darker pale-edged dorsal patches on 2-4; 11 and 12 usually orange or yellow; some whitish or yellowish oblique lateral streaks; spiracular line whitish, yellowish, or grey: on *Salix* and poplar; 6, 7, 9.

2. **N. dromedarius**, *L.* 39-46 mm. Forewings rather dark fuscous, costa whitish-sprinkled towards middle; a whitish-ochreous ferruginous-marked blotch on base of costa; first and second lines waved, darker fuscous, more or less edged externally with whitish-ochreous, extremities of second more strongly and followed by ferruginous suffusions; a dark reddish-fuscous pale-edged discal mark; praesubterminal line ferruginous or dark reddish-fuscous. Hindwings rather dark grey; a pale postmedian line.

Britain to Ross, N. Ireland, rather common; N. and C. Europe; 6. Larva variable, green, yellow, or yellowish-brown, the green often forming oblique streaks on sides; prominences on 5-8 and 12; dorsal line purple-brown; subspiracular usually purple-brown; head brown: on alder and sometimes birch; 7-9.

3. **N. tritophus**, *Esp.* 42-48 mm. Forewings dark fuscous, costa white-sprinkled towards middle; an ochreous-brown blotch on base of costa, and a suffusion beneath middle of disc; first and second lines waved, hardly darker, more or less edged externally with pale brown; a large slightly curved ochreous-brown whitish-edged discal mark; subterminal line pale brown, anteriorly darker-edged, near costa whitish. Hindwings whitish; a faint grey discal crescent and subterminal fascia; tornal cilia dark grey.

Essex, Devon, Gloucester, Renfrew, very scarce; C. Europe;

5, 8. Larva pale grey, brownish, or green, with darker lines; strong prominences on 6-8 and 12; a darker brown or grey dorsal line; spiracular brown or reddish-brown: on poplar or sometimes birch; 6, 7, 9.

4. **N. torva,** *Hb.* 42-46 mm. Forewings fuscous, sprinkled with pale greyish-ochreous; first and second lines waved, darker, externally pale-edged; a darker pale-edged discal mark; praesubterminal line rather darker. Hindwings grey; a pale postmedian line.

Norfolk, very scarce but possibly overlooked; C. Europe, N. Asia; 5, 8. Larva closely resembling that of *N. ziczac*, but much darker: on aspen; 6, 7. 9.

3. Drymonia, *Hb.*

Characters of *Notodonta*, but eyes glabrous; dorsal scale-tooth sometimes slight.

A rather small genus, apparently confined to the Northern hemisphere, especially in temperate regions. Larva without prominences or with one on 12 only.

1. Forewings with blackish subdorsal streak . 2.
,, without blackish subdorsal streak . 3.
2. Tornal mark of forewings white . . 1. *dictaeoides.*
,, ,, ,, brown, white-edged 2. *tremula.*
3. Forewings with whitish posterior fascia . . 4.
,, without whitish posterior fascia 3. *trepida.*
4. Forewings with dark fuscous discal mark. 5. *chaonia.*
,, without dark fuscous discal mark 4. *trimacula.*

1. **D. dictaeoides,** *Esp.* 42-50 mm. Forewings whitish, towards middle of costa mixed with pale brownish; an elongate blackish posterior costal blotch, marked with brown veins; a broad blackish brown-suffused subdorsal streak, white-edged beneath towards base and in middle, included dorsal space whitish-ochreous anteriorly, brown posteriorly, with an elongate-triangular white tornal mark; a brown subterminal suffusion. Hindwings whitish-fuscous, disc more whitish; a dark fuscous tornal suffusion.

Britain to Sutherland, N. and E. Ireland, rather common; N. and C. Europe; 5, 6, 8. Larva glossy purplish-brown; a prominence on 12; spiracular stripe yellow: on birch; 7, 9.

2. **D. tremula,** *Cl.* (*dictaea*, Esp.) 45-54 mm. Differs from *D. dictaeoides* as follows: forewings more brownish-mixed, tornal

mark narrower and much more elongate, brown with white margins; hindwings clear whitish, dorsally ochreous-tinged, tornal suffusion including a whitish terminal mark.

Britain to Ross, N. and E. Ireland, rather common; N. and C. Europe; 5-8. Larva green or brown, sometimes with darker transverse markings; a prominence on 12; spiracular line yellow, in brown specimens usually obsolete: on poplar, *Salix*, and alder; 7-9.

3. **D. trepida**, *Esp.* 50-60 mm. Forewings pale greyish-ochreous, densely sprinkled with dark grey, anteriorly yellowish-tinged; subbasal and first lines blackish, dentate; second waved, grey, posteriorly pale-edged, extremities blackish, followed by two longitudinal dark fuscous lines beneath costa; an ochreous-fuscous pale-edged discal mark, joined to costa by a dark grey mark; a praesubterminal series of dark fuscous pale-edged marks. Hindwings ochreous-whitish, base more ochreous, apex grey-suffused.

Britain to the Clyde, E. Ireland, not common; C. Europe; 5. Larva reposing with both extremities raised; green; dorsal line double, yellowish; subdorsal yellowish, less distinct; seven oblique lateral streaks, upper half red, lower yellow; yellowish lateral blotches on 2 and 3: on oak; 6, 7.

4. **D. trimacula**, *Esp.* (*dodonaea*, Hb.) 36-40 mm. Forewings whitish, suffused with light fuscous; subbasal line dark fuscous; a dark fuscous suffusion near before first line, not reaching costa; first line dark fuscous, followed by a rather dark fuscous band, beyond which is a rather broad clear whitish sometimes dark-sprinkled fascia including the dark fuscous second line, and suffusedly edged with dark fuscous; cilia distinctly barred. Hindwings pale fuscous, with two suffused darker fasciae.

Britain to the Clyde, S. Ireland, not common; WC. Europe; 5, 6. Larva green; dorsal line double, yellowish; subdorsal yellowish; spiracular yellow, more or less red-marked: on oak; 7-9.

5. **D. chaonia**, *Hb.* 36-40 mm. Forewings fuscous, rather darker anteriorly; lines dark fuscous, subbasal whitish-edged; first whitish-edged anteriorly, second waved, preceded by a whitish sometimes interrupted fascia and whitish-edged posteriorly; a dark fuscous discal mark; subterminal line obscurely whitish. Hindwings light fuscous, with traces of paler fasciae.

Britain to the Clyde, E. and S. Ireland, not common; C. Europe; 5. Larva green; subdorsal and spiracular lines yellow: on oak; 6-8.

4. Gluphisia, *B.*

Eyes glabrous. Antennae in ♂ shortly bipectinated to apex. Palpi rather short, rough-haired. Thorax with slight anterior crest. Posterior tibiae without middle-spurs, all tarsi rough-scaled. Forewings: 10 out of 9 near base. Hindwings: 8 approximated to end of cell.

A small North American genus, of which only one species occurs in Europe. Larva without prominences. Pupa in a cocoon between leaves.

1. **G. crenata**, *Esp.* 28-31 mm. Forewings dark grey; subbasal line dark fuscous, edged with pale ochreous; median band brownish, edges dark fuscous, pale-margined, posterior waved; median line suffused, dark grey; discal mark pale, dark-edged; subterminal line cloudy, grey-whitish, posteriorly dark-edged. Hindwings grey; a darker postmedian line and terminal band.

Essex, Bucks, Isle of Man (?), very scarce; C. Europe; 5, 6. Larva green; a dorsal series of transverse divided ferruginous-red marks on 3, 4, and 7-13; subdorsal line yellow: on poplar; 8, 9.

5. Stauropus, *Germ.*

Eyes glabrous. Tongue rudimentary. Antennae in ♂ strongly bipectinated, apical $\frac{1}{5}$ simple. Palpi rather short, rough-haired. Thorax with slight anterior crest. Anterior tarsi rough-scaled; posterior tibiae without middle-spurs. Forewings: 10 out of 9 above 7. Hindwings: 8 approximated to beyond middle of cell.

A rather limited Indo-Malayan genus, of which one species occurs in Europe. Larva with 2nd and 3rd pair of legs extremely long, and numerous prominences; anal prolegs obsolete, replaced by two long filaments; in repose both extremities sharply erected.

1. **S. fagi**, *L.* 50-62 mm. Forewings whitish-ochreous, densely sprinkled with grey, darker and more yellowish-tinged on median band, especially anteriorly, more brownish dorsally, more whitish towards base; a black basal dot; edges of median band darker, dentate, pale-margined; median line obscurely darker; a postsubterminal series of dark grey spots. Hindwings fuscous, paler basally, darker dorsally, towards apex suffused with dark grey.

England to York, not common; C. Europe; 6, 7. Larva ochreous-brown marked with deeper brown or blackish; incisions deep; 5-10 with pairs of prominences, posteriorly smaller; 12 and 13 much swollen: on beech, oak, etc.; 8, 9. It has been suggested that this curious larva resembles a dead and crumpled beech-leaf.

6. PTILOPHORA, *Stph.*

Eyes glabrous. Antennae in ♂ very strongly bipectinated to apex. Palpi rather short, rough-haired. Thorax with slight anterior crest. Anterior tarsi rough-scaled; posterior tibiae without middle-spurs. Forewings: 5 weak, 10 out of 9 near base. Hindwings: 8 approximated to end of cell.

Only one species is satisfactorily established. Larva without prominences, beneath neck with a protrusible furcate appendage.

1. **P. plumigera**, *Esp.* 32-40 mm. Forewings thinly scaled, reddish-ochreous-brown, veins fuscous; a longitudinal greyish posterior suffusion above and below middle; first line sometimes faintly yellowish; second obscurely yellowish, waved, distinct on costa; sometimes an obscure yellowish terminal band, interrupted by the grey suffusions; cilia dark-spotted. Hindwings thinly scaled, pale reddish-grey; a faint pale postmedian fascia.

Hants to Bucks, Gloucester, Devon, local; C. Europe; 10, 11. Larva whitish-green; dorsal stripe broad, light blue-green; subdorsal line white; spiracular double, whitish: on maple and sycamore; 5, 6.

7. PTEROSTOMA, *Germ.*

Eyes glabrous. Antennae in ♂ bipectinated to apex. Palpi very long, erect, clothed with long dense rough scales. Thorax with strong triangular central crest. Abdomen with small dorsal crest. Forewings with dorsal scale-tooth; 10 rising separate, connected or anastomosing with 9. Hindwings: 8 approximated to beyond middle.

Besides the one European, there are two or three Central Asiatic species. Larva without prominences.

1. **P. palpina**, *L.* 38-46 mm. Forewings light brown, partially mixed with whitish-ochreous, veins finely blackish; an oblique blackish mark from base of costa; first and second lines obscurely darker, double, dentate, forming blackish dots on veins; median line suffusedly darker, very obscure; termen waved. Hindwings dark grey, towards base pale fuscous.

Britain to Ross, E. Ireland, common; Europe, Asia Minor;

6, 7. Larva pale bluish-green; subdorsal and lateral lines white, tubercular; spiracular yellow, black-edged above, on 2-4 pinkish-marked: on poplar and *Salix;* 7-9.

8. ODONTOSIA, *Hb.*

Eyes hairy. Antennae in ♂ dentate, fasciculate-ciliated. Palpi rather short, rough-haired. Thorax sometimes with strong triangular central crest. Abdomen with small dorsal crest. Forewings with dorsal scale-tooth; 10 rising separate, connected or anastomosing with 9. Hindwings: 8 approximated to cell to beyond middle.

A small genus, principally Asiatic, but occurring throughout the Northern hemisphere. Larva sometimes with prominence on 12, and then holding anal extremity aloft in repose.

1. Thoracic crest very large . . . . 2.
   ,, ,, obsolete . . . 3. *carmelita.*
2. Forewings with whitish terminal blotch . 2. *cuculla.*
   ,, without whitish blotch . 1. *camelina.*

1. **O. camelina**, *L.* 36-40 mm. Forewings rather dark reddish-ochreous-brown; a dark brown dorsal suffusion, including a brownish-ochreous patch along basal half of dorsum; subbasal, first, and second lines indistinct, dark fuscous, dentate; beyond second a series of whitish-ochreous dots and black dashes on veins; termen waved. Hindwings fuscous; a pale posterior line, intersecting a dark fuscous tornal spot.

Britain to Sutherland, Ireland, common; N. and C. Europe, N. Asia; 5, 6. Larva resting with head thrown back; green, sometimes pinkish-ochreous or purplish; dorsal line darker; spiracular yellow, red-spotted; 12 with two red tubercular projections: on oak, beech, hazel, etc.; 7-10.

2. **O. cuculla**, *Esp.* (*cucullina*, Hb.) 34-36 mm. Forewings red-brown, darker dorsally, costa broadly suffused anteriorly with pale ochreous; first and second lines dark fuscous, dentate, traceable towards extremities only; a white blotch including a grey suffusion along lower $\frac{2}{3}$ of termen, interrupted by a median bar marked with a black vein; veins towards apex dark fuscous. Hindwings fuscous; a faint pale posterior line, intersecting a dark fuscous tornal spot.

S. England to Leicester and Norfolk, local; C. Europe; 5, 6. Larva whitish-green or pale flesh-colour; on 2-5 a dark green or purplish dorsal blotch, thereafter reduced to slender dorsal and subdorsal lines; subspiracular sometimes yellowish; 12 with bicuspidate prominence: on maple; 7-9.

3. **O. carmelita**, *Esp.* 40-44 mm. Forewings purple-fuscous, suffusedly irrorated with whitish; costa broadly dark reddish-brown; first and second lines sometimes grey, first preceded and second followed by series of whitish and blackish dots on veins, forming yellow-whitish costal spots, second larger; an obscure fuscous-whitish blotch along lower half of termen; termen waved; cilia sharply barred. Hindwings whitish-fuscous, darker towards apex; a pale postmedian line; a purplish-grey tornal suffusion.

Britain to the Clyde, scarce and local; C. Europe; 4. Larva green, with yellowish freckles tending to form lines; spiracular line yellow, pink-spotted: on birch; 6, 7.

9. HIEROPHANTA, *Meyr.*

Eyes glabrous. Antennae in ♂ shortly bipectinated. Palpi rather short, rough-haired. Thorax hardly crested. Anterior tarsi rough-scaled. Forewings with dorsal scale-tooth; 10 rising separate, connected or anastomosing with 9. Hindwings: 8 approximated to cell to beyond middle.

Only the one species is known. Larva without prominence, often resting with anal extremity raised. Pupa in a cocoon between leaves.

1. **H. bicoloria**, *Schiff.* 35-37 mm. Forewings white; a black subbasal dot; a small patch of blackish irroration on and before dorsal tooth; first line waved, black, not reaching margins, edged posteriorly by an orange streak, connected with second near dorsum by an orange bar; second reduced to a series of dark grey marks, black opposite the bar; a light orange tornal spot. Hindwings white.

Devon, Stafford, S. Ireland, rare and very local; C. Europe; 5, 6. Larva pale yellowish or whitish-green; dorsal, subdorsal, and lateral lines green; spiracular yellow, edged with green: on birch; 7, 8.

10. CERURA, *Schrk.*

Eyes glabrous. Antennae in ♂ bipectinated to apex. Palpi rather short, rough-haired. Thorax with slight anterior crest. Anterior tarsi rough-scaled; posterior tibiae without middle-spurs, end-spurs very short. Forewings: 6 out of 9 remote from base, 10 rising separate, connected or anastomosing with 9. Hindwings: 8 approximated to cell to beyond middle.

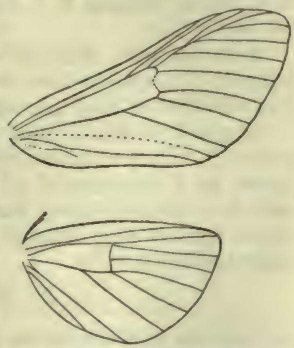
A genus of some extent, ranging throughout the Northern hemisphere, with stragglers in S. America and Australia.

Larva with two tubercles or rough spots on 2, back prominent on 3 or 4, anal prolegs absent, anal extremity held aloft in repose, furnished with two long slender terminal processes containing exsertible filaments. Pupa in a hard woodlike cocoon on bark of trees.

1. Lines of forewings partly orange-edged . . 2.
,, ,, not orange-edged . 1. *vinula.*
2. Anterior edge of band irregularly indented 4. *bicuspis.*
,, ,, ,, nearly straight . . 3.
3. Posterior edge of band angulated or bent inwards 3. *furcula.*
,, ,, ,, evenly curved . 2. *bifida.*

1. **C. vinula**, *L.* 58-72 mm. Forewings whitish, veins partially blackish; a black subbasal dot; lines double, dark grey, forming black costal dots; first formed anteriorly of black dots, posteriorly subdentate; space between first and median greyish-tinged; median sinuate; second partly triple, very strongly dentate; a crescentic blackish discal mark; a terminal series of longitudinal dark grey interneural marks. Hindwings in ♂ whitish, with grey discal crescent, in ♀ grey.

Britain to the Hebrides, Ireland, common; Europe, WC. and N. Asia; 5, 6. Larva green; a broad purplish-brown pale-streaked white-edged dorsal band, narrowed to 4, thence expanded to 8, where it sometimes projects to proleg, and again narrowed to 12; head brown: on poplar and *Salix*; 6-8.



Neuration of *Cerura vinula.*

2. **C. bifida**, *Hb.* 40-44 mm. Forewings grey-whitish; a black subbasal dot; lines double; first nearly straight, formed by a series of black dots and a black orange-edged streak; space between first and median densely irrorated with dark grey; median curved inwards, formed by a black orange-edged streak and a fine dark grey line; second triple, dark grey, dentate, posteriorly black and orange-edged on upper half, followed by a dark grey suffusion; a black discal mark; large terminal black dots. Hindwings whitish; a grey discal crescent and usually a terminal band.

England to York, Ireland, rather common; C. Europe, NW.

Asia; 6, 7. Larva green; a broad purplish yellow-edged dorsal band, narrowed to end of 3, interrupted on 4, thence expanded to 8, where it reaches spiracles, and again narrowed to 12; head brown: on poplar; 7, 8.

3. **C. furcula**, *L.* 32-38 mm. Differs from *C. bifida* as follows: wings often greyer, forewings with anterior band and posterior dark suffusion more or less mixed with orange, black streaks more strongly orange-margined, posterior edge of band more or less angulated inwards above middle, middle stria of second line blacker towards costa.

Britain to Ross, Ireland, common; N. and C. Europe; 6, 7. Larva green; a broad purplish whitish-edged dorsal band, partially mixed with yellow or orange, narrowed to beginning of 4, thence widened to 7, from 9 narrowed to 12; head brown: on *Salix;* 7-9.

4. **C. bicuspis**, *Bkh.* 36-40 mm. Differs from *C. bifida* as follows: forewings whiter, both edges of median band more or less indented or bent inwards above middle.

England to York, local and scarce; C. Europe; 5. Larva green; a broad reddish-brown yellow-edged dorsal band, narrowed to 3, interrupted on 4, thence expanded to 8, where it includes spiracle, again narrowed to 10, thence nearly even, edges on 6-8 very deeply dentate; head reddish-brown: on alder and birch; 7-9.

11. Phalera, *Hb.*

Eyes in ♂ glabrous, in ♀ partly pubescent. Antennae in ♂ dentate, fasciculate-ciliated. Palpi rather short, rough-haired. Thorax slightly crested posteriorly. Abdomen with small dorsal crest. Forewings: 10 rising separate, connected or anastomosing with 9. Hindwings: 8 approximated to end of cell.

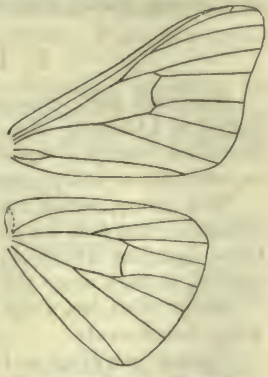
A rather limited genus, ranging over Europe, Asia, and the Malayan islands. Larva without prominences, covered with numerous fine silky hairs.

1. **P. bucephala**, *L.* 56-62 mm. Head and front of thorax yellowish, ferruginous-marked. Forewings brown mixed with ashy-grey, suffused with whitish towards base and dorsum, with waved darker striae; subbasal line fine, blackish; first and second double, inner stria black, outer ferruginous; a transverse whitish-edged discal spot; a large oval pale ochreous-yellowish apical blotch, limited by second line, including two elongate waved ochreous patches. Hindwings yellow-whitish; two partial indistinct fuscous postmedian striae.

Britain to Ross, Ireland, common; Europe, WC. and N. Asia; 5-7. Larva dull yellowish; an orange transverse band on each segment; nine interrupted blackish lines; head black: on elm, hazel, etc.; 7-9. The imago curiously resembles a piece of stick of which the end has been obliquely cut off.

9. SATURNIADAE.

Head densely rough-haired. Ocelli absent. Eyes glabrous. Tongue rudimentary. Antennae under ½, in ♂ strongly bipectinated to apex. Labial palpi very short, hairy. Thorax densely hairy above and beneath. Abdomen hairy. Femora and tibiae densely hairy, posterior tibiae without middle-spurs. Forewings: 1b furcate, 5 and 6 closely approximated from upper angle, 7 absent, 8 and 9 out of 10, 11 absent. Hindwings without frenulum, 1a absent, 5 and 6 approximated from upper angle, 7 from ⅔ of upper margin, 8 out of cell at base, rapidly diverging, a praecostal spur faintly indicated.


Neuration of *Saturnia pavonia.*

A small family, mainly occurring within the tropics, but with a few stragglers in temperate climates. The species are all large, and sometimes gigantic, the Indian *Attacus atlas* measuring ten inches in expanse of wing, and their decoration is often correspondingly magnificent; the single British species is one of the smallest. Imago with body relatively short and stout, forewings broad and large.

Ovum flattened-spherical, smooth. Larva stout, with tubercles bearing tufts of scanty hairs. Pupa in a dense firm oval cocoon.

1. SATURNIA, *Schrk.*

Characters those of family.

A somewhat limited Asiatic genus, extending into Europe and N. Africa.

1. **S. pavonia,** *L.* (*carpini,* Schiff.) 50-80 mm. Forewings whitish or pale ochreous, densely irrorated with blackish-grey, somewhat crimson-mixed; lines whitish, edged with dark fus-

cous, second waved; a white discal blotch including a large round black spot, in which is an ochreous ring edged anteriorly with deep crimson and blue-whitish; black ante-apical and deep crimson subapical spots; white subterminal and brownish terminal streaks. Hindwings as forewings, but without apical spots, in ♂ suffused with orange.

Britain to the Orkneys, N. and W. Ireland, somewhat local; Europe, N. and WC. Asia; 5. Larva bright green; on each segment a transverse series of yellow or rosy tubercles, bearing tufts of blackish hairs, often placed in black transverse bands: on *Calluna*, *Salix*, blackthorn, etc.; 6-9.

3. LASIOCAMPINA.

Maxillary palpi obsolete. Forewings: 1c absent, 5 approximated to 4 towards base, 9 and 10 stalked. Hindwings without frenulum (except *Drepanidae*), 1c absent, 8 approximated to 7 beyond cell, or seldom connected or anastomosing with cell only.

This group, which may probably once have been much more extensive, has now ceased to occupy a foremost position. The three families which represent it in Britain muster but few species, though some are conspicuous from their large size.

Imago with forewings more or less broad-triangular; hindwings broad-ovate.

Type of markings as in *Notodontina.*

Larva usually with 10 prolegs, those on 13 sometimes absent.

Pupa with segments 9-11 free; not protruded from cocoon in emergence.

The three families spring independently from a common ancestral form, which must itself have been developed from the *Heterogeneidae.*

Tabulation of Families.

1. Frenulum present . . .	1. DREPANIDAE.
,, absent . . .	. . 2.
2. Forewings with 7 out of 10 .	2. ENDROMIDIDAE.
,, 7 separate from 10 .	3. LASIOCAMPIDAE.

1. DREPANIDAE.

Ocelli present. Eyes glabrous. Antennae ½, in ♂ bipectinated. Labial palpi rather short, subascending, loosely or shortly rough-scaled, terminal joint short, rather pointed. Thorax rather hairy beneath. Forewings: 1b furcate, lower branch

indistinct, 7 anastomosing or connected with 8, 9 and 10 out of 8. Hindwings with frenulum, 5 rather approximated to 4, upper margin of cell half as long as lower so that transverse vein is very oblique, 6 and 7 widely remote, parallel, 8 approximated to 7 beyond cell or anastomosing with cell and 7.

A family of no great extent, fairly developed in the Indo-Malayan region, but very scantily elsewhere. Imago with body slender, forewings broad; the species are of moderate or rather small size.

Ovum roundish-oval, surface finely pitted. Larva rather slender, without prolegs on 13, anal extremity prolonged into a long projection, which is raised in repose. Pupa in a cocoon above ground.

The three British genera very inadequately represent the family. *Falcaria* is a derivative of *Drepana*, but *Cilix* belongs to another group of the family, differing much in superficial appearance.

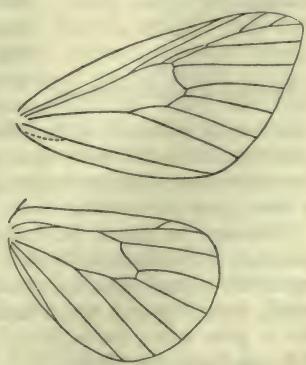
TABULATION OF GENERA.

1. 8 of hindwings anastomosing with cell and 7 . 1. CILIX.
„ „ approximated to 7 beyond cell . 2.
2. Posterior tibiae without middle-spurs . 2. FALCARIA.
„ „ with all spurs present . 3. DREPANA.

1 CILIX, *Lch.*

Head smooth. Tongue absent. Antennae in ♂ shortly bipectinated, apex simple. Posterior tibiae with all spurs present. Forewings: 6 separate. Hindwings: 8 anastomosing with cell and 7 from before middle of cell to beyond middle of 7.

There is only one known species. The frenulum, though present, is very short and slight.


Neuration of *Cilix glaucata.*

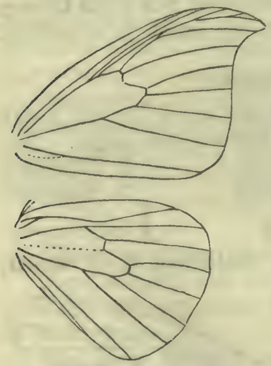
1. **C. glaucata,** *Sc.* (*spinula*, Schiff.) 20-25 mm. Forewings white; an irregular grey median band, not nearly reaching costa, partly tinged with yellow-ochreous, marked with silvery-white in veins in disc, and with leaden-metallic and blackish towards dorsum; a praesubterminal grey line, and postsubterminal series of blackish-grey spots, not

reaching costa; an interrupted grey terminal streak. Hindwings white, often greyish in disc; a narrow grey terminal fascia.

Britain to Lanark, Ireland, common; C. and S. Europe, WC. Asia, N. America; 5, 6, 8. Larva dark brown, paler and reddish-tinged dorsally, especially on 5 and 6; dorsal line darker; sometimes a spiracular white spot on 12; pairs of small tubercular prominences on 3 and 4: on hawthorn and blackthorn; 6, 7, 9, 10. The imago undoubtedly imitates the excrement of birds.

2. Falcaria, *Hw.*

Head smooth or hairy. Tongue developed. Antennae in ♂ bipectinated to apex. Posterior tibiae without middle-spurs. Forewings: 6 separate. Hindwings: 8 approximated to 7 near beyond its origin.



Neuration of *Falcaria falcataria*.

Some Asiatic and North American species are probably to be included with the following.

Termen of forewings dentate 1. *lacertinaria*.
„ „ not dentate 2. *falcataria*.

1. **F. lacertinaria**, *L.* (*lacertula*, Schiff.) 31-35 mm. Forewings ochreous, mixed and strigulated with dark fuscous; veins darker; first and second lines dark fuscous, nearly straight, parallel; a black discal dot; apex suffused with ochreous-brown; termen irregularly dentate; cilia blackish, spotted with white. Hindwings whitish-ochreous, fuscous-sprinkled, posteriorly brownish-tinged; a faint grey postmedian line; a dark fuscous discal dot.

Britain to Ross, N. Ireland, rather common; N. and C. Europe, N. America; 5, 6, 8. Larva ochreous-brown, darker-marked; dorsal line anteriorly pale, dark-edged, posteriorly dark, interrupted; two blackish dorsal marks on 6, preceded by a pale area; pairs of tubercular prominences on 3, 4, and 12: on birch; 6, 7, 9.

2. **F. falcataria**, *L.* (*falcula*, Schiff.) 33-37 mm. Forewings ochreous-whitish to ochreous-brown; lines waved, dark fuscous, first preceded by a fainter line, second acutely angulated, pre-

ceded by an oval blackish spot in middle; two blackish dots longitudinally placed in disc, second larger; a deep brown curved line from apex to dorsum at ¾; an interrupted dark fuscous postsubterminal line; termen below apex suffused with dark brown. Hindwings with ground as forewings; five waved lines and a discal dot dark fuscous.

Britain to Ross, S. Ireland, common; N. and C. Europe, Asia Minor; 5, 8. Larva green; dorsal area red-brown, on 2-5 sometimes green; on 3-6 pairs of tubercular prominences bearing a few hairs; on 7-12 much smaller similar tubercles: on birch, oak, *Salix*, etc.; 6, 7, 9.

3. Drepana, *Schrk.*

Head smooth. Tongue developed. Antennae in ♂ bipectinated, towards apex simple. Posterior tibiae with all spurs present. Forewings: 6 out of 7 near base. Hindwings: 8 approximated to 7 near beyond its origin.

A genus of some extent, mainly Asiatic, but extending into Europe and North America. Larva with two tubercular prominences on 4.

1. Forewings with darker discal yellow-marked blotch 1. *harpagula.*
,, without yellow-marked blotch . 2.
2. Forewings with one dark discal dot . 3. *cultraria.*
,, ,, two dark discal dots . 2. *binaria.*

1. **D. harpagula**, *Esp.* (*sicula*, Hb.) 33-39 mm. Forewings deep brownish-ochreous, dusted with bluish-silvery; first and second lines darker, waved, slightly curved, second black-marked in middle; an irregular bilobed tawny discal blotch, containing several small yellowish spots; an ashy terminal fascia not reaching margins, subterminal line within it blackish-edged, waved; termen prominent below middle. Hindwings with colour, first and second lines, and smaller discal blotch as in forewings; subterminal faint.

Somerset (near Bristol), other records doubtful, very local; C. Europe; 5, 6. Larva yellow, speckled with dark brown; 2-4 brownish-suffused; a lateral pinkish-brown stripe waved so as to be strongly prominent upwards on 6 and 7: on *Tilia parvifolia;* 7-9.

2. **D. binaria**, *Hufn.* (*hamula*, Esp.) 26-32 mm. Forewings ochreous-brown; lines indistinct, pale, first curved, second curved above middle; two blackish dots obliquely placed in disc; a blackish apical mark. Hindwings ochreous-brown,

costa broadly suffused with orange-yellow; first and second lines yellowish.

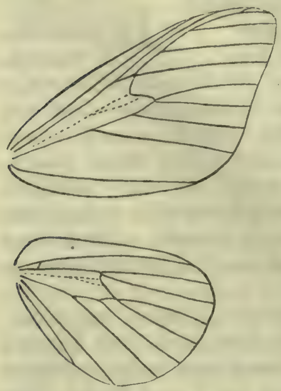
S. England to Derby, Cumberland, not common; C. and S. Europe, Asia Minor; 5, 6, 8. Larva brownish-ochreous; 2-4, 12, 13, brown-suffused; a dark brown lateral stripe, waved upwards on 6: on oak; 6, 7, 9.

3. **D. cultraria**, *F.* (*unguicula*, Hb.) 22-30 mm. Forewings brownish-orange; median band more brownish, edges darker, anterior curved, posterior bent or abruptly curved near costa; a dark fuscous discal dot; a darker brown terminal streak. Hindwings orange; median band brownish-tinged, edges darker, obsolete towards costa; indistinct brownish subterminal and terminal streaks.

S. England to Hereford and Norfolk, common; C. Europe, Asia Minor; 5, 8. Larva ochreous-brown, marked with darker reddish-brown; dorsal line darker; a whitish lateral line, suffusedly edged beneath with dark brown, waved so as almost to meet dorsally on 6 and 10: on beech; 6, 7, 9.

2. ENDROMIDIDAE.

Head densely rough-haired. Ocelli present. Eyes glabrous. Tongue rudimentary. Antennae under ½, in ♂ bipectinated to apex. Labial palpi rather short, densely hairy. Thorax densely hairy above and beneath. Abdomen densely hairy. Femora and tibiae densely hairy, posterior tibiae without middle-spurs, end-spurs very short. Forewings: 1b simple, 4 and 5 connate from lower angle, 6 from near 9, 7 and 8 out of 10. Hindwings without frenulum, 4 and 5 connate from lower angle, 6 and 7 connate, 8 connected by bar with cell near base.



Neuration of *Endromis versicolora.*

Only a single species is known in this family; it appears to stand remote from anything else, and must be a remnant of an otherwise extinct branch. The imago is large, with rather stout body, and rather elongate-triangular forewings; it flies by day.

Ovum rounded-oblong, smooth. Larva stout, attenuated anteriorly, with few hairs, all prolegs developed. Pupa in a tough elongate-oval cocoon above ground.

1. ENDROMIS, *O.*

Characters those of family.

1. **E. versicolora**, *L.* 50-85 mm. Forewings ochreous-brown, median band in ♀ much suffused with white; lines blackish, externally whitish-edged, first somewhat curved inwards, second rectangularly broken below middle; an angulated blackish discal mark; a partial white subterminal line, forming three connected spots towards apex; veins terminally white. Hindwings in ♂ orange, in ♀ whitish; markings as in forewings but less developed, first line absent.

Britain to Caledonian Canal, local; N. and C. Europe; 4. Larva pale green; dorsal line darker green; on 5-11 a lateral series of oblique whitish or yellowish dark-edged stripes; spiracular area beneath these deep green, irrorated with black; spiracles white; a pointed prominence on 12, with whitish lateral stripes: on birch; 6, 7.

3. LASIOCAMPIDAE.

Head densely rough-haired. Ocelli absent. Eyes partly or wholly hairy. Tongue obsolete. Antennae in ♂ bipectinated to apex. Labial palpi porrected, densely rough-haired. Thorax densely hairy above and beneath. Abdomen hairy. Femora and tibiae densely hairy, posterior tibiae without middle-spurs, end-spurs short. Forewings: 1b simple, 8 to termen. Hindwings without frenulum, 4 and 5 approximated or stalked, 8 anastomosing or connected with 7 or upper margin of cell.

Fairly numerous in species, and generally distributed except in New Zealand, but more commonly within the tropics. Imago with stout body and rather elongate-triangular forewings; usually of moderate or large size, and generally nocturnal in habit. A near relationship to the *Psychina* is indicated by the pseudoneuria or false veins which are often developed (in exotic forms sometimes much more numerously) as branches from vein 8 of the hindwings to the costa; these are very subject to variation, and are also frequently ill-defined or irregular or partially obsolete.

Ovum oval, smooth. Larva stout, more or less densely clothed with hairs, all prolegs developed. Pupa in a dense firm oval cocoon above ground.

Odonestis and *Gastropacha* are correlated early types; *Clisiocampa* and *Eriogaster* are developments of *Odonestis*, and *Lasiocampa* of *Eriogaster*.

TABULATION OF GENERA.

1. Forewings with rounded dorsal prominence on 1b . . . 5. GASTROPACHA.
,, without dorsal prominence . . . 2.
2. Hindwings with 7 from angle . . . 3. CLISIOCAMPA.
,, ,, from upper edge of cell . . . 3.
3. Hindwings with one or more pseudoneuria . . . 4.
,, without pseudoneuria . . . 1. LASIOCAMPA.
4. Palpi short . . . 2. ERIOGASTER.
,, long . . . 4. ODONESTIS.

1. LASIOCAMPA, *Schrk.*

Palpi short. Forewings: 6, 7 8 approximated at base, 9 to termen. Hindwings: 6 from angle of cell, 7 from upper margin before middle, 8 connected or anastomosing shortly with 7.

A small genus, apparently confined to the European region. The imago flies in hot sunshine.

Hindwings with yellowish fascia . . . 1. *quercus.*
,, without yellowish fascia . . . 2. *trifolii.*

1. **L. quercus**, *L.* (*roboris*, Schrk.; *callunae*, Palmer) 52-74 mm. Forewings in ♂ deep reddish-brown, in ♀ deep ochreous, sometimes tinged with reddish-brown; a white dark-edged discal spot; a sinuate postmedian ochreous-yellowish fascia, variable in width. Hindwings as forewings, but without discal spot; fascia sometimes extending to termen.

Britain to the Orkneys, Ireland, common, but apparently less so than formerly; Europe, WC. and N. Asia; 7. Larva black, hairs light brown, on sides darker brown; lateral line white, more or less interrupted; often series of red or whitish marks beneath this; subdorsal red or whitish spots on 3 and 4; spiracles white: on hawthorn, *Calluna*, etc.; 9-5.

2. **L. trifolii**, *Esp.* 42-68 mm. Forewings dull grey-reddish; a white or whitish dark-edged discal spot; second line curved or subsinuate, obscurely ochreous-whitish, in ♂ dark-edged anteriorly; terminal area in ♂ irrorated with pale yellowish. Hindwings grey-reddish, lighter in ♀.

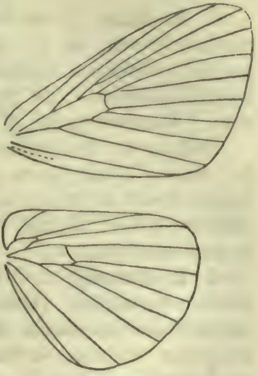
Kent to Devon, Warwick to Lancashire, local; C. and S. Europe, Asia Minor to Syria, N. Africa; 8. Larva black, hairs pale orange, on sides pale greyish; subdorsal line sometimes whitish; sometimes subdorsal red spots on 3 and 4; spiracles yellow: on *Trifolium*, *Cytisus*, *Calluna*, etc.; 9-6.

2. ERIOGASTER, *Germ.*

Palpi short. Forewings: 6 and 7 connate or stalked, 9 to apex or termen. Hindwings: 6 from angle, 7 from upper margin before middle, 8 connected or anastomosing with 7 (sometimes also part of cell), a praecostal spur and sometimes one or two pseudoneuria before or beyond this.

A moderate group of nearly cosmopolitan distribution.

1. Forewings with white discal spot 2. *lanestris*.
„ without white discal spot . 2.
2. Hindwings with pale median line 3.
„ without median line 3. *rubi*.
3. Base of forewings brown . . . 1. *populi*.
„ „ grey . . . 4. *crataegi*.



Neuration of *Eriogaster rubi*.

1. **E. populi**, *L.* 35-42 mm. Forewings thinly scaled, blackish-grey; a brown basal patch, limited by curved whitish first line; costa sometimes reddish-brown; second line irregular, whitish; cilia dark brown, whitish-spotted. Hindwings thinly scaled, grey; a cloudy whitish median line; cilia as in forewings.

Britain to Ross, N. Ireland, common; N. and C. Europe; 11, 12. Larva pale grey, sometimes whitish or greenish-tinged, marked with dark fuscous, hairs short, dark fuscous, on sides longer, grey; a dorsal series of dark fuscous or grey connected blotches, sometimes orange-marked: on oak, birch, poplar, etc.; 5, 6.

2. **E. lanestris**, *L.* 33-43 mm. Forewings reddish-fuscous, darker towards base, costa, and dorsum, posteriorly whitish-sprinkled; a white basal spot or irregular mark; a white discal spot; second line slightly curved, white; cilia dark brown.

Hindwings thinly scaled, light reddish-fuscous; a cloudy whitish median line.

Britain to Argyll, N. and W. Ireland, common; N. and C. Europe, WC. Asia to N. Persia; 2, 3. Larva black, hairs very long, red-brown; subdorsal series of red-brown partly black-edged blotches, more or less margined with pale yellowish, sometimes connected beneath by a pale yellowish line: on hawthorn and blackthorn, living gregariously in a nest of dense web; 5-7.

3. **E. rubi**, *L.* 44-66 mm. Forewings in ♂ rather dark reddish-brown, in ♀ lighter, less reddish, and sprinkled with greyish-ochreous; first and second lines nearly straight, parallel, whitish-ochreous; an irregular obscure pale subterminal suffusion. Hindwings in ♂ red-brown, in ♀ lighter brown.

Britain to Sutherland, Ireland, local; Europe, NW. Asia; 6. Larva black, hairs golden-brown, on sides dark fuscous; a dorsal series of transverse orange streaks: on *Calluna*, *Helianthemum*, grass, *Rubus*, etc.; 8-5. The male imago flies wildly in hot sunshine.

4. **E. crataegi**, *L.* 30-37 mm. Forewings grey or dark grey, whitish-sprinkled; lines white, internally blackish-edged, first curved, second twice sinuate; subterminal indicated by an irregular whitish suffusion. Hindwings light grey, darker posteriorly; a cloudy pale or whitish median line, anteriorly edged with dark grey.

Britain to Ross, rather common; Europe, Asia Minor; 9. Larva black, grey, or whitish marked with black, hairs reddish-brown; in pale specimens an irregular dark dorsal band; subdorsal series of brown-red spots, sometimes separated by whitish-ochreous spots: on hawthorn, blackthorn, etc.; 5, 6.

3. CLISIOCAMPA, *Curt.*

Palpi short. Forewings: 6 and 7 connate or stalked, 8 sometimes out of 9 near base, 9 to apex. Hindwings: 4 and 5 sometimes stalked, 6 and 7 approximated at base from angle, 8 anastomosing shortly with cell about middle, one or two pseudoneuria present.

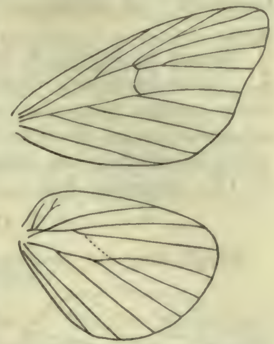
A genus of few species, principally North American, but ranging also through Europe and Asia. Larva gregarious when young.

Second line of forewings indented in middle . 1. *castrensis.*
„ „ „ not indented . 2. *neustria.*

1. **C. castrensis**, *L.* 29-38 mm. Forewings from pale ochre-

ous-yellowish to reddish-ochreous-brown; lines reddish-ochreous-brown, in dark specimens edged outwardly with pale yellowish suffusion, first somewhat curved, indented beneath costa, second subsinuate, indented in middle; sometimes a dark praesubterminal suffusion. Hindwings brown or reddish-brown; sometimes an indistinct pale yellowish median line.

Kent, Suffolk, York, in salt marshes, local; Europe, NW. and WC. Asia to Turkestan; 7, 8. Larva bluish-grey, sides ochreous-marked; subdorsal line broad, orange-brown, black-marked; lateral orange-brown, black-marked, sometimes interrupted; hairs brownish-orange: on *Artemisia*, *Daucus*, *Plantago*, etc.; 5, 6.



Neuration of *Clisiocampa neustria*.

2. **C. neustria,** *L.* 28-38 mm. Forewings whitish-ochreous, often brownish-sprinkled, or wholly light red-brown; lines brown, first hardly curved, second hardly sinuate, in dark specimens externally edged with whitish-ochreous. Hindwings from whitish-ochreous to light red-brown.

England to York, common; Europe, N. and W. Asia; 7, 8. Larva reddish-orange above, on sides grey-blue, black-speckled; dorsal line white, black-edged; subdorsal black, blue-speckled; supraspiracular and subspiracular waved, orange; black lateral spots on 3, 4, and 12; a black prominence on 12; hairs brown; head grey-blue, black-marked: on apple, hawthorn, blackthorn, etc.; 5, 6. Formerly sometimes injurious in orchards, but now less plentiful.

4. ODONESTIS, *Germ.*

Palpi rather long. Forewings: 6 and 7 connate or stalked, 9 to apex. Hindwings: 6 from angle, 7 from beyond middle of cell, 8 connected with 7 near origin by oblique bar, two or three pseudoneuria present.

A limited genus, chiefly Indo-Malayan and Australian, but ranging into Europe and Africa. Larva with long tufts on 2 and 12.

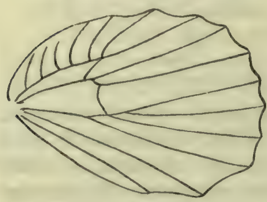
1. **O. potatoria,** *L.* 46-63 mm. Forewings ochreous-yellowish, in ♂ deeper and suffused with brown, especially towards costa; two silvery-white dark-edged discal spots transversely

placed, upper smaller; second line subsinuate, dark brown, running to apex; praesubterminal obscure, fuscous, waved. Hindwings ochreous-yellowish, in ♂ wholly, in ♀ posteriorly suffused with brownish; an indistinct darker postmedian line running to apex.

Britain to Argyll, N. Ireland, common; C. Europe, N. Asia; 7. Larva blue-grey, finely black-sprinkled and yellow-dotted; some orange spiracular marks; hairs light yellow-brownish; subdorsal series of short black hair-tufts; spiracular series of white hair-tufts; two long tufts on 2, and a long blackish tuft on 12: on grass; 9-5.

5. Gastropacha, *O.*

Palpi long or moderately long. Forewings with strong rounded dorsal prominence on apex of 1b; 6 and 7 stalked, 8 sometimes out of 7, 9 to termen or apex. Hindwings: 4 and 5 sometimes stalked, 6 and 7 approximated at base from angle, 8 connected with cell by long oblique bar or anastomosing with 7 near origin, from one to six pseudoneuria present.



Hindwing of *Gastropacha quercifolia.*

A small European and Asiatic genus. In repose the dilated costal area of the hindwings projects much beyond the forewings, causing a very leaf-like appearance.

Termen dentate; hindwings with six pseudoneuria
1. *quercifolia.*
" not dentate; hindwings with one or two pseudoneuria . . . 2. *ilicifolia.*

1. **G. quercifolia,** *L.* 52-80 mm. Forewings with 9 to termen; red-brown, with purple-bluish gloss, towards costa blackish-mixed, dorsally ferruginous; first, second, and praesubterminal lines blackish-grey, waved, bent near costa; a blackish-grey discal mark; termen waved-dentate. Hindwings as forewings, but lines indistinct, straight, costal area ferruginous, with about six blackish pseudoneuria; 8 connected with cell by long bar.

England to York, less common than formerly; C. Europe, N. and WC. Asia; 6. Larva dark grey or brown; whitish dorsal marks on 3 and 4; 2nd and 3rd incisions deep indigo-blue; a prominence on 12; a subspiracular series of tubercles and fringe of pale hairs: on hawthorn, blackthorn, and *Salix;* 9-5.

2. **G. ilicifolia**, *L.* 35-40 mm. Forewings with 9 to apex; brownish-ferruginous, slightly whitish-sprinkled; first and second lines dark grey, waved, interrupted, curved near costa; a dark grey discal mark, preceded by a whitish suffusion; a broad terminal band of whitish irroration, including a darker interrupted line, not reaching costa; cilia white, barred with dark ferruginous. Hindwings purplish-fuscous; two suffused whitish bands; 8 connected with 7, with one or two pseudoneuria.

Stafford, York, local and now scarce; C. Europe, NW. Asia; 4, 5. Larva grey or reddish, hairs reddish; dorsal line black, interrupted with reddish, edged with whitish; lateral blue-grey, interrupted: on *Vaccinium* and *Salix*; 7, 8.

4. PAPILIONINA.

Head rough-haired. Ocelli absent. Tongue developed. Antennae slender, dilated apically, forming a gradual or abrupt club. Labial palpi moderately long, more or less rough-haired, terminal joint rather pointed. Maxillary palpi obsolete. Thorax more or less hairy. Forewings: 1b simple, 1c absent, 5 usually from or above middle of transverse vein. Hindwings without frenulum; 1c absent, 3 and 4 usually connate, 8 rising out of cell near base, rapidly diverging.

Although a most extensive group, by far the greater proportion of species occur within the tropics, especially in S. America, where they are excessively numerous, a single valley sometimes containing as many species as the whole of Europe; in New Zealand and the Pacific Islands there are extremely few. All the species fly by day, and usually in hot sunshine. Imago with more or less slender body, broad-triangular forewings, and broad-ovate hindwings. From their bright colours and diurnal habits these insects are favourites with beginners, and are popularly regarded as forming, under the name of "butterflies," a group of equal systematic value to the whole of the other *Lepidoptera*, which are termed "moths"; but there is no scientific justification for such a division. In repose the wings are usually erected and appressed together above the back, thus exposing the under-surface to view; hence the colouring of this, instead of following the type of the upper surface, is often highly specialised with a view to concealment, except the disc of the forewings, which is then generally hidden by the hindwings.

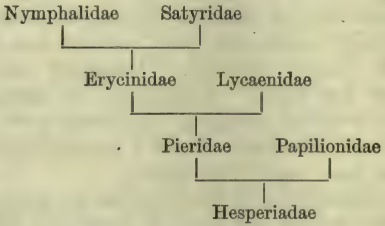
Type of markings theoretically as in the *Notodontina*, but the lines are so often converted into bands or rows of spots or largely obsolete, that in practice no definite type is in general recognisable.

Larva with 10 prolegs.

Pupa with segments 9-11 free or partly or wholly fixed; remaining fixed during emergence.

Although seven families are here maintained, there would be considerable justification for uniting the *Satyridae* with the *Nymphalidae*, and the *Lycaenidae* with the *Pieridae*. It may also be remarked that the *Hesperiadae* are much more distinct from all the other families, than these are from one another. The group as a whole certainly stands rather conspicuously isolated at the present day, but there is little doubt that its origin must be traced to the *Thyrididae*, a family of the *Pyralidina* not represented in Britain and hardly in Europe.

PHYLOGENY OF PAPILIONINA.



TABULATION OF FAMILIES.

1. Forewings with all veins present and separate 7. HESPERIADAE.
„ with two or more veins stalked or coincident . . . 2.
2. Anterior legs of ♂ useless for walking . . 3.
„ „ well-developed . . 5.
3. Anterior legs of ♀ useless for walking . . 4.
„ „ well-developed . 3. ERYCINIDAE.
4. Forewings with 12 greatly dilated at base 2. SATYRIDAE.
„ „ not basally dilated 1. NYMPHALIDAE.
5. Hindwings with 1a absent . 6. PAPILIONIDAE.
„ „ 1a present . . . 6.
6. Anterior tarsi of ♂ more or less abbreviated, or with one or both claws absent . 4. LYCAENIDAE.
„ „ „ not abbreviated, claws developed 5. PIERIDAE.

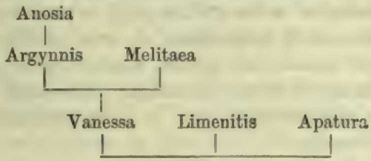
1. NYMPHALIDAE.

Anterior legs in both sexes much reduced, useless for walking; posterior tibiae without middle-spurs. Forewings: 8 and 9 out of 7. Hindwings with praecostal spur.

An extremely large family, mainly tropical. The species are of large or moderate size, usually dark-coloured with light or bright bands or rows of spots.

Ovum cylindrical or subconical, ribbed and often reticulated. Larva with pairs of tentacles or more usually series of bristly spines. Pupa exposed, suspended by the tail, often angular or with metallic spots.

Phylogeny of Nymphalidae.



Tabulation of Genera.

1. Eyes hairy . . . . . 2.
„ glabrous . . . . . 3.
2. Hindwings with transverse vein absent between 4 and 5 5. **Limenitis.**
„ „ „ present 4. **Vanessa.**
3. Hindwings with transverse vein absent between 4 and 5 4.
„ „ „ present . 5.
4. Forewings with 10 out of 7 . . 3. **Melitaea.**
„ „ 10 separate . . 6. **Apatura.**
5. Club of antennae abrupt . . 2. **Argynnis.**
„ „ elongate, gradual . 1. **Anosia.**

1. Anosia, *Hb.*

Eyes glabrous. Club of antennae elongate, gradual. Forewings: 10 separate. Hindwings with transverse vein present.

A genus of moderate extent, generally distributed within the tropics, with two or three species ranging beyond them. Imago with termen of forewings subconcave. Larva with pairs of long tentacles. Both larva and imago are protected by a strong nauseous scent or taste, and are uneatable to birds.

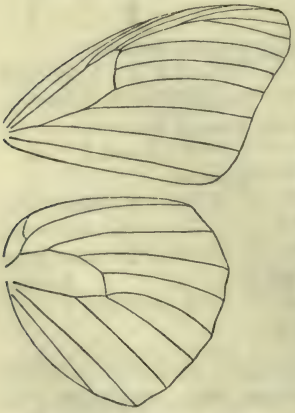
1. **A. erippus**, *Cr.* (*archippus*, F.; ?*plexippus*, L.) 95-102 mm. Forewings deep brownish-orange, veins marked with blackish streaks; a blackish border all round, on costa with some white spots towards middle, on termen with a double row of whitish spots; a blackish costal blotch beyond middle, enclosing about five ochreous-orange spots. Hindwings with colour, veins, and terminal band as in forewings; in ♂ a black glandular spot on vein 2 before its middle. Wings beneath paler, especially hindwings, white spots larger.

Kent to Cornwall, an occasional immigrant since 1876; W. coast of Europe (an immigrant only), N. and S. America, Pacific Islands to Celebes, E. Australia, New Zealand; 8-10. Larva black, banded with yellow and white; two long black dorsal tentacles on 2, two others shorter on 12: on *Asclepias;* 5-8. Pupa very stout, pale green, marked with golden-metallic and black. Indigenous to America; elsewhere it has spread since 1870 or thereabouts, but is now established where its food-plant is found.

2. ARGYNNIS, *F.*

Eyes glabrous. Club of antennae abrupt. Forewings: 10 separate or out of 7. Hindwings with transverse vein present.

A considerable genus, ranging through most of the Northern hemisphere, with a small outlying group in the mountains of Chili, and one species in C. Africa; in warmer latitudes the species are alpine. Larva with six series of strong bristly spines. Pupa often with angular prominences and golden-metallic spots.



Neuration of *Argynnis adippe.*

1. Hindwings beneath with suffused silvery streaks 1. *paphia.*
   Hindwings beneath with distinct silvery spots 2.
2. Hindwings beneath with spots in subterminal band . . . . 3.
   „ without spots in subterminal band 3. *aglaia.*

3. Forewings with silvery subapical spots . 4. *lathonia.*
„ without silvery subapical spots . 4.
4. Subterminal spots of hindwings beneath silvery-centred 2. *adippe.*
„ „ „ not silvery-centred 5.
5. Hindwings beneath with one discal silvery spot 5. *euphrosyne.*
„ „ several discal silvery spots 6. *selene.*

1. **A. paphia,** *L.* 63-73 mm. Forewings and hindwings deep ochreous-orange, in ♀ sometimes pale and suffused with blackish irroration, appearing dark greenish; veins black, in ♂ partly marked with black streaks; some discal bars, an irregular median, and two posterior series of spots black. Hindwings beneath greenish; two ill-defined anterior fasciae not reaching below middle, and narrow median and terminal fasciae purplish-silvery; a postmedian series of pale darker-edged spots.

Britain to the Clyde, Ireland (except N.), common; Europe, N. and C. Asia, Japan; 7. The dark variety of ♀ (*valesina,* Esp.) occurs principally in the New Forest. Larva ochreous-brown, darker-striated; a double yellow dorsal line enclosing a black line, edged externally with black spots; lateral line darker or blackish, interrupted; head black, marked with pale yellow; 2 with two much longer spines: on *Viola;* 9-5.

2. **A. adippe,** *L.* 52-60 mm. Forewings and hindwings deep ochreous-orange; veins, some discal bars, an irregular median, and two posterior series of spots black; termen of forewings subsinuate. Hindwings beneath yellow-ochreous; several anterior silvery-white spots; a postmedian series of silvery-white spots, followed by a series of ferruginous-red spots with bluish-silvery centres; a terminal sometimes indistinct series of silvery-white spots, edged anteriorly with ferruginous-red.

England to Cumberland, common; Europe, N. and C. Asia, Japan; 7. Larva reddish-ochreous, freckled with pinkish and black; dorsal line pale, edged with black spots; sides blackish-streaked; head reddish, black-freckled: on *Viola;* 3-6. Alleged British records of *A. niobe,* L., are apparently founded on varieties of this species.

3. **A. aglaia,** *L.* 51-62 mm. Differs from *A. adippe* as follows: forewings beneath with some small subterminal silvery spots towards apex; hindwings beneath yellow-ochreous, suffused with greenish except on subterminal band, with

several anterior spots, and postmedian and terminal series silvery-white.

Britain to Sutherland, N. and E. Ireland, local; Europe, Asia Minor, N. Asia, Japan; 7. Larva dark violet-grey, black-marbled; a double ochreous-yellow dorsal line enclosing a black line; a subspiracular series of red spots connected by an ochreous line; head black: on *Viola*; 4-6.

4. **A. lathonia,** *L.* 42-52 mm. Differs from *A. adippe* as follows: forewings beneath with several silvery-white spots towards apex; hindwings beneath yellow-ochreous, mixed with reddish, with seven blotches and two or three spots on anterior half and a terminal series of spots silvery-white, and a subterminal series of dark fuscous spots with silvery-white centres.

S. England to Norfolk and Somerset, York, S. Ireland, scarce, not permanently resident; Europe, NC. and WC. Asia, N. Africa; 8, 9. Larva brownish-grey; dorsal line whitish; spiracular double, ochreous; head ochreous, black-marked: on *Viola*; 10-6.

5. **A. euphrosyne,** *L.* 38-45 mm. Differs from *A. adippe* as follows: forewings with termen rounded; hindwings beneath yellow, partly suffused with ferruginous-reddish except on a black-edged antemedian band including a central silvery-white blotch, with a basal submedian spot and a terminal series silvery-white, and a subterminal series of small dark spots.

Britain to Sutherland, common; Europe, Asia Minor, N. Asia; 5, 6. Larva black; dorsal line double, grey; spiracular double, whitish-grey; subdorsal spines yellowish, rest black; head black: on *Viola*, seldom *Primula*; 7-4.

6. **A. selene,** *Schiff.* 38-45 mm. Differs from *A. euphrosyne* as follows: hindwings beneath with two additional blotches on antemedian band and several cloudy spots beyond it silvery-white.

Britain to Ross, common, once in E. Ireland (?); N. and C. Europe, Asia Minor, N. Asia; 6, 7. Larva pinkish-fuscous; subspiracular line light pinkish; spines ochreous, partly preceded by black spots, two on 2 much longer; head blackish: on *Viola*; 7-5.

[Stray specimens of *A. dia*, L., have been taken in Britain, but the probabilities seem in favour of their having been artificially introduced.]

3. MELITAEA, *F.*

Eyes glabrous. Club of antennae abrupt. Forewings: 10

out of 7. Hindwings with transverse vein absent between 4 and 5.

A rather limited genus, inhabiting Europe, N. and C. Asia, N. Africa, N. America. Some of the European species allied to *M. athalia* form an exceedingly difficult group, in which the limits of the species are hardly determinable. Larva with numerous rows of spines clothed or surrounded with bristles. Pupa stout, sometimes with orange spots.

1. Hindwings with subterminal row of black dots . 2.
,, without subterminal dots . 3. *athalia.*
2. Hindwings beneath with several rows of dots 2. *cinxia.*
,, ,, with one row of dots . 1. *aurinia.*

1. **M. aurinia,** *Rott.* (*artemis*, Hb.) 35-41 mm. Hairs of palpi reddish-orange. Forewings and hindwings ferruginous-orange, with black veins, and suffused ochreous-yellowish bands or series of spots limited by thick blackish lines; hindwings with subterminal series of black dots. Hindwings beneath as above, but pale bands more developed, subterminal black dots pale-circled.

Britain to Caledonian Canal, Ireland (except N.), local; N., C., and SW. Europe, Asia Minor, N. Asia, N. Africa; 6. Larva black, with numerous whitish dots; nine rows of short black bristly spines; head black: on *Scabiosa succisa;* 8-5.

2. **M. cinxia,** *L.* 42-48 mm. Hairs of palpi blackish. Forewings and hindwings brownish-orange, basally blackish; veins, some discal bars, and three narrow posterior fasciae blackish. Hindwings beneath ferruginous-orange; basal, median, and terminal black-edged whitish-yellow bands, containing series of black dots or small spots; subterminal band of ground-colour with black veins and several blackish dots.

I. of Wight, very local, elsewhere extinct, but formerly ranging from Kent and Hants to York; Europe, Asia Minor, N. Asia; 5, 6. Larva black, with scattered white dots; eight rows of short black spines, placed in fascicles of bristles; head and prolegs dull red: on *Plantago lanceolata* and *P. maritima;* 8-4. When young the larvae live gregariously in compact webs, in which they hibernate.

3. **M. athalia,** *Rott.* 36-43 mm. Hairs of palpi blackish. Forewings and hindwings brownish-orange, basally blackish; veins, some discal bars, and three narrow posterior fasciae blackish. Hindwings beneath ferruginous-orange, veins black; some anterior blotches, a median band, and terminal waved sfacia whitish-yellowish, edged and marked with black lines.

England to Lancashire, S. Ireland, very local, extinct in many places where it once occurred; Europe, Asia Minor, N. Asia, Japan; 6, 7. Larva black, lighter laterally, with white dots; eleven rows of whitish bristly spines, becoming orange-ochreous dorsally; head black, whitish-marked: on *Melampyrum*, *Plantago*, *Digitalis*, etc.; 8-5. The young larvae hibernate gregariously in a common web.

4. VANESSA, *F.*

Eyes hairy. Club of antennae abrupt. Forewings: 10 separate. Hindwings with transverse vein present.

A moderate genus, principally characteristic of the northern hemisphere. Larva with six or seven rows of bristly spines. Pupa with angular prominences, often with golden-metallic spots. In probably all the species the imago is able to produce a slight stridulation by rubbing together the dorsum of forewings and costa of hindwings.

1. Hindwings with a conspicuous projection . 2.
„ without conspicuous projection . 6.
2. Wings with bluish spots . . . . 3.
„ without bluish spots . . 1. *c-album.*
3. Forewings with black costal blotches . . 4.
„ without black costal blotches 5. *antiopa.*
4. Forewings with black subdorsal spots . . 5.
„ without black subdorsal spots . 4. *io.*
5. Forewings with costal subapical spot white 2. *urticae.*
„ „ „ yellow 3. *polychloros.*
6. Wings black, with red fasciae . . 6. *atalanta.*
„ brownish-orange, with black markings 7. *cardui.*

1. **V. c-album**, *L.* 46-58 mm. Forewings and hindwings with termen strongly irregularly dentate and deeply excavated; deep ferruginous-orange; several black anterior spots or blotches; a deep ferruginous-brown terminal band, including a series of orange spots. Wings beneath fuscous, irregularly marbled with dark and pale; hindwings with a clear white central **C**-shaped mark.

England, formerly common, now local and mainly western; Europe, N. and WC. Asia; 6, 9-5. Larva rather dark fuscous, laterally reddish-tinged; 7-12 broadly whitish dorsally; 13 with two white spots; seven rows of bristly pale brown or yellowish spines, whitish on the white area; head blackish: on *Humulus*, *Ribes*, and *Urtica*; 5-8.

2. **V. urticae,** *L.* 50-56 mm. Forewings with terminal projection above middle; deep orange, basally blackish sprinkled with yellowish; three black costal blotches separated by yellow blotches, third followed by a white spot; two black spots in disc posteriorly; a black dorsal blotch; a blackish terminal fascia including a series of blue spots. Hindwings with projection central; orange, basal half black mostly yellowish-sprinkled; terminal fascia as in forewings. Wings beneath as above, but as though very faded.

Britain to the Orkneys, Ireland, plentiful; Europe, N. and WC. Asia, Japan; 6, 8-5. Larva black, densely irrorated with yellow; often a suffused yellow double dorsal stripe, enclosing black dorsal line; lateral line yellowish, often faint; subspiracular yellowish, distinct; seven rows of dark greenish or black bristly spines; head black, irrorated with yellowish: on *Urtica*, feeding gregariously; 5, 7, 8.

3. **V. polychloros,** *L.* 62-67 mm. Differs from *V. urticae* as follows: wings more brownish-orange, forewings with spot beyond third blotch light yellowish, and an additional black spot before tornus; wings beneath with long scattered bristles.

Britain to Caledonian Canal, local, scarce in Scotland; Europe, N. and WC. Asia; 7-5. Larva blackish or dark grey; dorsal area suffusedly irrorated with ochreous-brownish, enclosing a black dorsal line; sides pale-sprinkled; subspiracular line brownish-ochreous; seven rows of brownish-ochreous bristly spines; head black: on elm, aspen, cherry, etc., feeding gregariously; 6.

4. **V. io,** *L.* 58-68 mm. Forewings with terminal projection above middle; brown-red, termen dark fuscous; two black costal blotches separated by a yellowish spot; beyond second a round blotch edged anteriorly with yellowish interrupted above with black, posteriorly with blue, followed by black spotted with blue; a series of five pale blue spots partly traversing this. Hindwings with projection central; brown-red, terminally dark fuscous; a round black blue-spotted subapical blotch, edged with pale yellowish. Wings beneath dark fuscous strigulated with black.

Britain to Caledonian Canal, Ireland, rather common; Europe, Asia Minor, NC. Asia; 8-5. Larva black, with transverse series of white dots; six rows of black bristly spines; head black: on *Urtica*, feeding gregariously in a web; 6, 7.

5. **V. antiopa,** *L.* 70-80 mm. Forewings with terminal projection above middle; dark fuscous, slightly reddish-tinged;

two pale yellowish spots on costa posteriorly; a pale yellow terminal fascia, preceded by a series of light lilac-blue spots. Hindwings as forewings, but projection central; no costal spots. Wings beneath as above, but as though faded, ground strigulated with black.

Britain to Caledonian Canal, S. Ireland, an occasional migrant only, but sometimes arriving in rather considerable numbers; Europe, Asia Minor, N. Asia, N. America; 8-5. Larva black, clothed with greyish-ochreous pubescence; a black dorsal line traversing a series of deep reddish spots; seven rows of black bristly spines; head black: on *Salix*, birch, poplar, etc.; 6, 7.

6. **V. atalanta**, *L.* 54-70 mm. Forewings with termen prominent below apex; black, anteriorly brown-tinged; a red fascia from before middle of costa to near tornus; several white spots towards apex. Hindwings without prominence; brownish-black; a red terminal fascia, containing a series of black dots, and a bluish tornal mark. Hindwings beneath brownish, irregularly marked with black.

Britain to the Shetlands, Ireland, common, rather irregular; Europe, Asia Minor, N. Africa, N. America; 9-6. Larva grey, dark brown, or blackish, freckled with greenish-yellow or whitish; subdorsal line sometimes yellowish; spiracular yellowish, distinct; seven rows of black or pale yellowish bristly spines; head dark fuscous or blackish: on *Urtica* and *Parietaria*, solitary, in a chamber formed of a spun leaf; 7, 8.

7. **V. cardui**, *L.* 56-66 mm. Forewings with termen sinuate; brownish-orange, basally blackish-mixed; an irregular interrupted black antemedian fascia; apical area black, including several white spots. Hindwings without prominence, brownish-orange; basal area and a median fascia blackish-mixed; three posterior rows of black spots; a bluish tornal mark. Hindwings beneath light brown with some white blotches and pale yellowish lines; subterminal spots ocellated with blue and black.

Britain to the Shetlands, Ireland, common, very irregular; Europe, Asia, Africa, America, Australia, Pacific Islands, practically cosmopolitan; 8-6. Larva greyish-ochreous, greenish, or blackish, yellowish-freckled; dorsal line black, sometimes yellowish-edged; subdorsal and lateral lines sometimes yellowish; spiracular pale yellow, distinct; seven rows of bristly spines; sometimes also a general clothing of dense hairs: on *Carduus*, *Urtica*, *Echium*, *Malva*, etc.; 6, 7, sometimes 9.

5. LIMENITIS, *F.*

Eyes hairy. Club of antennae very elongate and gradual. Forewings: 10 separate. Hindwings with transverse vein absent between 4 and 5.

Rather numerously represented in the Indo-Malayan region, less common in other parts of the northern hemisphere, only three species occurring in Europe. Larva with series of bristly spines. Pupa angular, partly green, with golden-metallic spots, head bifid.

1. **L. sibilla**, *L.* 52-60 mm. Forewings dark fuscous; an interrupted white postmedian fascia, cut by dark veins; three small whitish spots beyond this. Hindwings dark fuscous; a white median fascia, cut by dark veins. Wings beneath brownish-orange, with black bars and series of spots; white markings as above; hindwings with base and dorsum bluish-whitish.

S. England to Worcester and Lincoln, in woods, local, scarcer than formerly; C. Europe; 6, 7. Larva green, irrorated with yellow; a double dorsal series of reddish bristly spines, largest on 3, 4, and 6; spiracular line whitish, yellow-spotted, edged with rows of very short spines; subspiracular on 6-10 red-brown; head spinose, with two longer black spines on crown: on *Lonicera;* 9-5. An insect of especially graceful flight.

6. APATURA, *F.*

Eyes glabrous. Club of antennae elongate, gradual. Forewings: 10 separate. Hindwings with transverse vein absent between 4 and 5.

A small genus, but very generally distributed over the Northern hemisphere. Larva shaped much like a slug, with two long tentacles on the head; its colours are protective. Pupa stout, obtusely angular, green, head bifid.

1. **A. iris**, *L.* 64-84 mm. Forewings dark fuscous, disc in ♂ deep purple-blue in certain lights; an irregular interrupted central fascia and some posterior spots white. Hindwings with colour as in forewings, but less blue in ♂; a white median fascia not reaching dorsum; a black ferruginous-ringed sometimes whitish-centred spot towards tornus. Wings beneath brownish, partly suffused with ferruginous-red; white markings much as above; forewings with a posterior orange blotch containing a black bluish-centred spot.

S. England to Merioneth and Lincoln, local; C. Europe, Asia Minor; 7. Larva green, irrorated with yellow, paler posteriorly; subdorsal pale pinkish or yellowish line on 2-4; oblique yellow reddish-edged streaks on sides of 5-10; 13 pointed, slightly bifid; head green, with two long pale yellowish pink-tipped projecting tentacles: on *Salix caprea*; 8-6. The imago is fond of sitting on upper branches of oaks, and sometimes shows a taste for decaying animal matter.

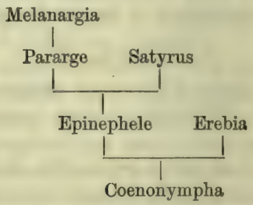
2. SATYRIDAE.

Characters of *Nymphalidae*, but forewings with 12 greatly dilated towards base.

Also a large group, of very general distribution. The species are usually of moderate size, generally dark-coloured with light bands or spots, and with several round black white-centred spots on lower surface. Some of them are more fond of shady places than is customary in this group.

Ovum spherical-ovate, surface reticulated and often ribbed. Larva more or less tapering towards extremities, with short hairs, 13 ending in two points; feeding on grass. Pupa suspended by the tail or unattached, sometimes subterranean.

Phylogeny of Satyridae.



Tabulation of Genera.

1.	Eyes hairy	2. PARARGE.
	„ glabrous	2.
2.	Middle tibiae short, with apical spine	3. SATYRUS.
	„ „ normal	3.
3.	Forewings with lower margin of cell basally dilated	4.
	„ „ „ not basally dilated	5.
4.	Forewings with 1b basally dilated	6. COENONYMPHA.
	„ „ not basally dilated	4. EPINEPHELE.
5.	Club of antennae abrupt	5. EREBIA.
	„ „ elongate, gradual	1. MELANARGIA.

1. Melanargia, *Meig.*

Eyes glabrous. Club of antennae very elongate, gradual.

The species are not very numerous; they inhabit C. and S. Europe, N. Africa, and WC. Asia, but especially the shores of the Mediterranean. Pupa unattached amongst moss or roots of grass.

1. **M. galathea,** *L.* 44-52 mm. Forewings black, with a blotch towards base, an irregular postmedian series of connected blotches, several usually contiguous spots towards apex, and a terminal series of spots yellow-whitish. Hindwings as forewings, but ante-apical spots nearly or quite absent. Hindwings beneath as above, but black ground much suffused with yellow-whitish; a posterior series of small black spots with pale lilac-blue centres.

England to Durham, local; C. and S. Europe, Asia Minor; 7, 8. Larva pale ochreous-yellowish or yellow-greenish; dorsal line and edges of subdorsal brownish or dark green; subspiracular paler; anal points pink; head pale pinkish-brown: on grasses; 9-6.

2. Pararge, *Hb.*

Eyes hairy. Club of antennae rather elongate.

A small genus, mainly European, but extending into the neighbouring regions. Pupa rather angular, suspended by the tail.

Markings light ochreous-yellowish . .	1. *aegeria.*
„ brownish-orange . .	2. *megaera.*

1. **P. aegeria,** *L.* 42-50 mm. Forewings dark fuscous; one or more spots in cell, a postmedian series of four spots, and a subapical blotch (sometimes reduced to two spots) light ochreous-yellowish; a round black white-centred spot in subapical blotch. Hindwings dark fuscous; a costal and discal spot and subterminal band light ochreous-yellowish, the band containing three black white-centred spots. Hindwings beneath lighter, subterminal ocelli dark brown, whitish-centred.

Britain to Caledonian Canal, Ireland, local, scarcer than formerly, common in SW. England and Ireland; Europe, Asia Minor to Syria, N. Africa; 4-10. Larva green; dorsal line dark green; subdorsal, double lateral, and spiracular lines greenish-yellowish; anal points whitish or pinkish: on grasses; 9-7. In Southern Europe and N. Africa the imago is much more deeply coloured.

2. **P. megaera,** *L.* 41-50 mm. Forewings dark fuscous;

several blotches in disc, two or three towards tornus, and a large subapical patch cut by dark veins brownish-orange; a black white-centred spot in subapical patch. Hindwings dark fuscous; two posterior brownish-orange bands, second containing usually three black white-centred spots. Hindwings beneath lighter-marked, subterminal ocelli small, black, white-centred, placed in orange brown-ringed spots.

Britain to Argyll and Aberdeen, Ireland, common, but has disappeared from some districts; Europe, Asia Minor, N. Africa; 5, 6, 8, 9. Larva green, irrorated with whitish; dorsal line darker green; subdorsal hardly paler; spiracular whitish; anal points pinkish; head green: on grasses; 6-4.

3. SATYRUS, *F.*

Eyes glabrous. Club of antennae abrupt. Middle tibiae less than half tarsi, with strong apical spine. Forewings: lower margin of cell greatly dilated towards base.

A genus of some extent, ranging through most of the Northern hemisphere. Pupa smooth, dark red-brown, beneath surface of ground.

1. **S. semele**, *L.* 48-64 mm. Forewings dark brown; a large posterior band more or less suffused with pale ochreous, containing two dark fuscous spots with white centres. Hindwings as forewings, but band more orange posteriorly, upper spot absent. Forewings beneath suffused with orange-ochreous in disc. Hindwings beneath brownish, strigulated with dark fuscous; an irregular suffused whitish median fascia.

Britain to Ross, Ireland, on heaths and downs, local; Europe, Asia Minor, N. Africa; 7, 8. Larva greyish-ochreous; dorsal line brown; subdorsal yellow-brownish; lateral dark brown, partly blackish-edged above; spiracular light brown; head brown, darker-marked: on grasses, sometimes subterranean in habit by day; 8-6.

4. EPINEPHELE, *Hb.*

Eyes glabrous. Club of antennae very elongate and gradual. Forewings: lower margin of cell greatly dilated towards base.

A small genus, mainly European and Central Asiatic. Pupa rounded-prominent, suspended by the tail.

1. Forewings with black white-centred spot towards
apex . . . . . 1.
„ without such spot . 3. *hyperanthus.*
2. Subapical black spot containing one white dot 2. *janira.*
„ „ two white dots . 1. *tithonus.*

1. **E. tithonus,** *L.* 34-42 mm. Forewings brownish-orange; margins dark fuscous, broadest terminally; towards apex a black spot containing two white dots; in ♂ a suffused dark fuscous median fascia not reaching dark costal border. Hindwings dark fuscous; a large brownish-orange posterior blotch; sometimes a small dark whitish-centred spot towards tornus. Hindwings beneath brown, posteriorly blotched with pale ochreous; two white blackish-edged posterior dots.

Britain to Argyll, Ireland (except N.), local, common in S. England; Europe (except NE.), Asia Minor; 7, 8. Larva pale ochreous, freckled with red-brown, sometimes greenish-tinged; dorsal line dark brown; lateral pale, darker-edged; subspiracular pinkish-white, dark-edged above; head ochreous, brown-freckled: on grasses; 9-6.

2. **E. janira,** *L.* 41-51 mm. Forewings rather dark fuscous; a round black white-centred spot towards apex, ringed with dull orange, in ♀ larger and placed in a large transverse dull orange patch. Hindwings dark fuscous, with slightly paler postmedian band. Forewings beneath orange, margins fuscous; spot as above. Hindwings beneath brownish, with broad paler postmedian band, often including two or three black dots. Varieties with upper surface partly bleached are not uncommon.

Britain to Sutherland, Ireland, very common; Europe, Asia Minor to Syria, N. Africa; 6-8. Larva dull green; dorsal line darker; spiracular whitish; anal points whitish or pink; head green: on grasses; 8-5.

3. **E. hyperanthus,** *L.* 40-46 mm. Forewings dark fuscous; one to three usually indistinct small black pale-ringed spots posteriorly. Hindwings dark fuscous, with one or two similar spots, sometimes white-centred. Wings beneath fuscous, yellowish-tinged; forewings with one to three, hindwings with five or six posterior black white-centred round spots, ringed with pale ochreous-yellowish; these are sometimes reduced to whitish dots or almost wholly obsolete.

Britain to Ross, Ireland (except N.), in woods, local, common in S. England; N. and C. Europe, N. Asia, Japan; 7, 8. Larva ochreous to pale brown-grey; dorsal line dark brown; lateral pale, darker-edged; subspiracular whitish; head ochreous, brownish-marked: on grasses in damp shady places; 9-6.

5. EREBIA, *Dalm.*

Eyes glabrous. Club of antennae abrupt.

An extensive and essentially alpine group, inhabiting the mountains of Europe, Asia, N. America, and S. Africa. Pupa unattached amongst stem-bases of grass. *E. ligea*, L., is said to have been taken in Scotland many years ago, but there can be little doubt that the record was erroneous, probably due to some confusion of specimens.

Forewings with posterior black white-centred spots . . . . 1. *aethiops*.
" without white-centred spots . 2. *epiphron*.

1. **E. aethiops,** *Esp.* (*medea*, Hb.; *blandina*, F.) 42-48 mm. Forewings dark fuscous; a dull ferruginous-red posterior band not reaching margins, enclosing three or seldom four black white-centred spots. Hindwings dark fuscous; band as in forewings but more indistinct and broken, with three indistinct spots. Hindwings beneath with pale postmedian band, including usually three white dots.

York to Inverness, local, in valleys, not above 800 feet; C. and SE. Europe, Asia Minor, N. Asia; 7, 8. Larva ochreous; dorsal line blackish-brown, pale-edged; lateral pale, interruptedly edged beneath with blackish-brown; supraspiracular and subspiracular pale; head ochreous: on grasses; 9-6.

2. **E. epiphron,** *Kn.* (*cassiope*, F.) 31-38 mm. Forewings dark fuscous; a posterior band of several cloudy dull reddish spots, enclosing blackish dots. Hindwings as forewings, but reddish spots fewer and smaller. Wings beneath as above, but reddish spots more indistinct or partly obsolete.

Lancashire to Inverness, W. Ireland, local, on mountains, 1000-3000 feet; 6, 7. Larva green; dorsal line darker, yellowish-edged; lateral yellow, dark-edged beneath; supraspiracular yellowish; subspiracular broad, whitish-yellow; head green: on grasses, especially *Nardus stricta*; 8-5.

6. Coenonympha, *Hb.*

Eyes glabrous. Club of antennae abrupt. Forewings: 1b and lower margin of cell greatly dilated towards base.

A considerable group of very general distribution, but principally in the Northern hemisphere. Pupa suspended by the tail.

Wings beneath with black ocellus on forewings only . . . 2. *pamphilus*.
" " with black ocelli on both wings or none . . . 1. *tiphon*.

1. **C. tiphon,** *Rott.* (*davus*, F.) 32-37 mm. Forewings greyish-fulvous, towards margins or wholly suffused with grey or fuscous; sometimes a blackish pale-ringed spot towards apex. Hindwings as forewings, but sometimes with several blackish pale-ringed subterminal spots. Wings beneath darker, with a variable irregular whitish postmedian fascia; in forewings two, in hindwings seven black white-centred pale-ringed subterminal spots, all often much reduced or wholly obsolete.

Derby to the Shetlands, Ireland, on boggy ground, common; N. and C. Europe, N. Asia (?); 6, 7. Larva green, whitish-irrorated; dorsal line dark bluish-green, edged with pale yellowish; lateral pale yellowish, dark-edged above; spiracular darker green; subspiracular pale yellowish; anal points pinkish; head green: on *Rhynchospora* and *Carex;* 8-5. Imago very variable, tending to produce tolerably constant local forms.

2. **C. pamphilus,** *L.* 27-33 mm. Forewings ochreous-orange; costa posteriorly and termen fuscous; a small dark fuscous spot towards apex, sometimes obsolete. Hindwings as forewings but more brownish-tinged, with indistinct paler postmedian fascia on costal half; no subapical spot. Forewings beneath with subapical spot black, white-centred, pale-ringed. Hindwings beneath grey, partly suffused with brown, postmedian fascia ochreous-whitish; sometimes a posterior series of cloudy brown spots enclosing pale dots.

Britain to the Shetlands, Ireland, very common; Europe, N. and WC. Asia, N. Africa; 5-9. Larva green; dorsal line darker green, pale-edged; lateral obscurely yellowish, dark-edged above; spiracular darker green; subspiracular yellowish; head green: on grasses; 7-4.

3. ERYCINIDAE.

Anterior legs in ♂ reduced, useless for walking, in ♀ well-developed; posterior tibiae without middle-spurs. Forewings: 8 and 9 out of 7. Hindwings with praecostal spur.

This extensive family, represented in Europe by a single species only, is mainly characteristic of tropical America, a few species also occurring in N. America and the Indo-Malayan region. Most of the species are rather small, usually dark-coloured, with light or bright spots or patches.

Ovum spherical, smooth. Larva stout, attenuated towards extremities, with tufts of short hairs. Pupa rounded, attached by the tail and a central belt of silk.

1. Nemeobius, *Stph.*

Eyes hairy. Club of antennae abrupt. Hindwings: 6 and 7 stalked.

Includes only the one species.

1. **N. lucina**, *L.* 27-31 mm. Forewings blackish; antemedian, postmedian, and almost terminal irregular brownish-orange fasciae cut by dark veins, last enclosing a series of small blackish spots. Hindwings as forewings, but antemedian fascia obsolete, postmedian reduced. Hindwings beneath with antemedian and postmedian series of large whitish spots.

Britain to Dumfries, in woods, rather local; C. and SW. Europe; 5, 6. Larva light brownish; dorsal line blackish or dark brown; subdorsal dark brownish, sometimes marked with dull yellowish spots; subspiracular yellow-ochreous; four series of ochreous or orange tubercles bearing tufts of hairs; head reddish-ochreous: on *Primula;* 7, 8.

4. LYCAENIDAE.

Anterior legs developed, but tarsi of ♂ more or less abbreviated, or with one or both claws absent; posterior tibiae without middle-spurs. Forewings: 7 absent, 8 and 9 stalked or coincident. Hindwings without praecostal spur.

The family is large, and very generally distributed. The species are of moderate size or more often rather small, usually blue, dark brown, or coppery-orange in colouring, often with series of small black pale-ringed spots on lower surface.

Ovum flattened-spherical or subcylindrical, reticulated and sometimes ribbed, seldom smooth (*L. arion*). Larva stout, with few hairs. Pupa attached by tail and a central belt of silk, or sometimes unattached or subterranean.

The relation of the genera is sufficiently expressed by their order.

Tabulation of Genera.

1. Forewings with 6 out of 9 . .	1. Thecla.
,, ,, 6 separate . . .	2.
2. Eyes glabrous . . .	2. Chrysophanus.
,, hairy	3. Lycaena.

1. Thecla, F.

Eyes hairy. Club of antennae elongate. Forewings: 6 out of 9, 8 out of 9 or absent.

A very considerable genus, chiefly South American, but also inhabiting N. America, Europe, N. and C. Asia, and N. Africa. Larva short, stout, narrowed towards extremities.

1. **T. rubi**, *L*. 25-31 mm. Forewings and hindwings rather dark fuscous, ochreous-tinged; hindwings with termen waved. Wings beneath rather metallic green, forewings becoming fuscous dorsally, sometimes with white postmedian line; hindwings sometimes with postmedian white line or series of dots.

Britain to Ross, Ireland, common; Europe, N. and WC. Asia, Japan, N. Africa; 5, 6. Larva green; dorsal line lighter, darker-edged; subdorsal series of oblique subconfluent streaks, edged beneath with dark green; spiracular line yellow; head pale brown: on *Genista*, *Cytisus*, *Ulex*, and *Vaccinium;* 6, 7. Pupa subterranean.

2. **T. pruni**, *L*. 31-36 mm. Forewings dark brown, in ♀ with indistinct orange subterminal spots towards tornus. Hindwings dark fuscous, with indistinct orange subterminal spots, more distinct towards tornus, especially in ♀; termen with a linear projection on 2. Wings beneath ochreous-brown; a postmedian series of white transverse linear marks; a subterminal orange band, preceded by a series of small black anteriorly white-edged spots, both partially obsolete in forewings.

England to Derby, local; C. Europe, NW. Asia; 6, 7. Larva green; dorsal and spiracular lines yellowish; head yellowish: on blackthorn; 4, 5. This larva, though not difficult to obtain, does not seem to have been satisfactorily described. Pupa attached by tail and central belt.

3. **T. w-album**, *Kn*. 27-35 mm. Forewings and hindwings dark fuscous; hindwings with long linear terminal projection on 2, and short tooth on 3. Wings beneath brown; a postmedian somewhat interrupted white line, in hindwings forming two sharp angles towards tornus; in hindwings an orange subterminal band, edged anteriorly with blackish preceded by whitish scales, posteriorly by two black spots towards tornus.

England to York, local; C. and SE. Europe, Asia Minor, N. Asia; 7. Larva green, segmental ridges yellowish; dorsal line double, darker green; lateral series of oblique darker green streaks; head blackish: on elm; 9-6. Pupa attached by tail and central belt.

4. **T. betulae**, *L*. 35-41 mm. Forewings dark brown; a blackish discal mark; an orange postmedian band, not reaching margins, in ♂ reduced to one or two paler spots. Hindwings

dark brown; two or three terminal orange spots towards tornus; a long linear terminal projection on 2, and short tooth on 3. Wings beneath brownish-orange; a postmedian white anteriorly fuscous-edged transverse line, and in hindwings also a central one; termen deeper orange.

England, W. and S. Ireland, local; C. Europe, Asia Minor, NC. Asia; 8, 9. Larva green; dorsal line darker, sometimes yellowish-edged; double lateral series of oblique yellowish streaks; subspiracular line yellow; head dark brown, pale-marked: on blackthorn; 5, 6. Pupa attached by tail and central belt.

5. **T. quercus**, *L.* 29-37 mm. Forewings dark fuscous, in ♂ purple-tinged; in ♀ anterior half deep purple-blue except on margins. Hindwings dark fuscous; a short linear terminal projection on 2. Wings beneath pale ochreous-grey; a white anteriorly dark-edged postmedian line; a pale waved subterminal line; two orange subterminal spots towards tornus, in forewings obscure, suffusedly dark-edged anteriorly, in hindwings upper black-centred, lower followed by a black dot.

Britain to Ross, E. and S. Ireland; Europe, Asia Minor; 7, 8. Larva dull light reddish-brown, darker laterally; dorsal line darker, yellowish-edged; a darker dorsal blotch on 3; lateral series of oblique pale or whitish streaks, edged below with dark fuscous; spiracular yellowish; head dark fuscous: on oak, seldom *Salix*; 5, 6. Pupa subterranean.

2. CHRYSOPHANUS, *Hb.*

Eyes glabrous. Club of antennae elongate. Forewings: 6 separate, 8 and 9 stalked.

An extensive and nearly cosmopolitan genus. Larva short, stout, attenuated at extremities, with short hairs. Pupa attached by the tail and central belt of silk, or sometimes unattached on the ground. Besides the following, *C. virgaureae*, L., and *C. hippothoe*, L. (*chryseis*, Bkh.), have been recorded as British, but the evidence is insufficient to show that they occurred naturally.

1. Hindwings with linear terminal projection on 2 1. *argiades*.
„ without linear projection . . 2.
2. Hindwings beneath with orange markings . 3.
„ „ without orange markings . 5.
3. Forewings dark fuscous . . . 4. *astrarche*.
„ coppery-orange . . . 4.

4. Hindwings beneath with black pale-ringed spots 6. *dispar*.
„ „ with obscure darker dots 5. *phlaeas*.
5. Hindwings beneath with two antemedian spots 2. *minimus*.
„ „ „ one antemedian spot 3. *semiargus*.

1. **C. argiades,** *Pall.* 25-28 mm. Wings in ♂ purple-blue, termen slenderly dark fuscous, in ♀ rather dark iridescent fuscous, with a few purplish scales, sometimes with obscure orange spots before termen; hindwings with a fine linear terminal projection on 2. Wings beneath ochreous-grey-whitish; discal mark of forewings, two anterior spots of hindwings, and a postmedian series black, white-ringed; a double subterminal series of fuscous spots, sometimes enclosing obsolete orange spots, two conspicuous orange spots below middle of hindwings followed by black spots with bluish-silvery specks.

Hants, Dorset, Somerset, very scarce and local; C. and S. Europe, NC. Asia; 5, 6, 8. Larva pale green; dorsal line darker; lateral series of oblique darker streaks: on *Trifolium*, *Lotus*, etc.; 6, 7, 9-4.

2. **C. minimus,** *Fuesl.* (*alsus*, F.) 19-25 mm. Wings dark fuscous, purple-tinged, in ♂ sprinkled with pale blue. Wings beneath ochreous-grey-whitish, basally bluish-tinged and black-sprinkled; discal mark, two anterior spots of hindwings, and a postmedian series black, white-ringed.

Britain to Caledonian Canal, Ireland, on chalk and limestone, local; Europe, Asia Minor, N. and NC. Asia; 5, 6. Larva brown-pinkish; dorsal line darker; lateral series of oblique brown streaks; spiracular line whitish: on flowers of *Anthyllis*; 7, afterwards remaining unchanged and stationary to 5. Pupa unattached on the ground.

3. **C. semiargus,** *Rott.* (*acis*, Schiff.) 28-33 mm. Wings in ♂ purple-blue, sprinkled with dark fuscous, veins and narrow terminal streak dark fuscous, in ♀ rather dark iridescent fuscous, with a few purplish scales. Wings beneath pale greyish-ochreous, basally pale blue sprinkled with black; discal mark (sometimes indistinct), anterior subcostal spot of hindwings, and a postmedian series black, white-ringed.

England to York, in uncut meadows, always local, now very scarce or perhaps extinct; Europe, N. and W. Asia; 6, 7. Larva green; dorsal line darker; lateral series of oblique darker streaks; head dark brown: on *Anthyllis*; 8, 9.

4. **C. astrarche**, *Bgstr.* (*medon*, Esp.; *agestis*, Hb.; *artaxerxes*, F.) 23-28 mm. Wings dark iridescent fuscous; a subterminal series of deep orange spots, sometimes obsolete; forewings with a black discal mark, sometimes white-edged or wholly white. Wings beneath pale brown; discal mark, three anterior spots of hindwings, and a postmedian series black, broadly white-ringed, sometimes wholly white; a subterminal series of orange spots, edged first with black and then with white.

Britain to Aberdeen, somewhat local; Europe, N. and WC. Asia, N. Africa; 5, 6, 8. From Durham northwards the white-spotted variety (*artaxerxes*) prevails. Larva green; dorsal line pink or purple-brown; spiracular rosy-pink; head black: on *Helianthemum* and *Erodium;* 7, 9-4. Pupa sometimes unattached.

5. **C. phlaeas**, *L.* 26-33 mm. Forewings bright deep coppery-orange; antemedian and discal spots, and a postmedian series black; costa and narrow terminal fascia dark fuscous. Hindwings dark fuscous; a terminal coppery-orange fascia, edged with rows of blackish-spots, sometimes preceded by pale bluish dots. Forewings beneath as above, but borders pale brownish, an additional black spot near base. Hindwings beneath pale brownish; four anterior dots and a postmedian series darker; a reddish-orange subterminal suffusion. The orange colour is sometimes much suffused with dark fuscous, or rarely replaced by shining whitish.

Britain to Caledonian Canal, Ireland, common; Europe, N. and WC. Asia, Japan, N. Africa, N. America; 5-8. Larva green; dorsal line faintly brownish; spiracular sometimes rosy-pink; head pale brownish: on *Rumex;* 6-4. Pupa attached by the tail and a central belt.

6. **C. dispar**, *Hw.* (*hippothoe*, Lew.) 40-48 mm. Forewings deep coppery-orange, costa posteriorly and terminal fascia (in ♂ very narrow) dark fuscous; antemedian and discal spots (in ♂ small) and in ♀ a postmedian series blackish. Hindwings coppery-orange, in ♀ suffused with dark fuscous except on veins and a subterminal fascia; a blackish discal mark; a waved dark fuscous terminal streak. Forewings beneath orange; three spots and a postmedian series black, pale-ringed; a terminal whitish fascia. Hindwings beneath ochreous-grey-whitish, basally bluish; discal mark, five anterior spots, and a postmedian series black, white-ringed; an orange fascia before termen, edged with black dots.

Suffolk and Norfolk to Hants, in fens, local, wholly extinct since about 1860; WC. and SE. Europe, Asia Minor, WC. Asia; 7, 8. Larva green; dorsal line darker: on *Rumex hydrolapathum*; 9-6. Pupa attached by tail and a central belt.

3. Lycaena, *F.*

Eyes hairy. Club of antennae elongate. Forewings: 6 separate, 8 and 9 stalked.

A large genus of nearly universal distribution, though there is no strictly indigenous species in New Zealand. Imago usually with a horny apical hook on anterior tibiae. Larva short, stout, attenuated at extremities, with short hairs. Pupa attached by tail and often a central belt of silk, or unattached or subterranean.

1. Hindwings with linear terminal projection on 2 . . 1. *baetica.*
,, without such projection . . . 2.
2. Hindwings beneath with orange subterminal spots 3.
,, ,, without orange spots . . 6.
3. Cilia barred . . . . . . 4.
,, not barred . . . . . . 5.
4. Wings of ♂ or basal scales of ♀ pale blue 3. *corydon.*
,, ,, ,, ,, ,, lilac-blue 4. *bellargus.*
5. Forewings beneath with two anterior spots 6. *icarus.*
,, ,, without anterior spots 5. *aegon.*
6. Forewings above with black postmedian spots 7. *arion.*
,, ,, without such spots . 2. *argiolus.*

1. **L. baetica,** *L.* 26-30 mm. Wings fuscous, in ♂ suffused with purple-blue except on termen, in ♀ on basal half only; hindwings with long linear terminal projection on 2, and a blackish subterminal spot on each side of it. Wings beneath pale brownish, with irregular partly connected white striae; hindwings with white posterior fascia, and two black partly orange-edged spots, marked with pale metallic green-blue, before termen above tornus.

Sussex, I. of Wight, Hants, an occasional immigrant only; W. France, S. Europe, C. and S. Asia, Africa, Australia, Pacific Islands; 8, 9. Larva green to reddish-brown; dorsal line darker; lateral series of oblique pale streaks; spiracular white: on seedpods of *Pisum*, *Colutea*, *Vicia*, etc.; 6, 7. Pupa attached by tail and central belt.

2. **L. argiolus,** *L.* 30-35 mm. Wings in ♂ purple-blue,

terminal edge dark fuscous, in ♀ paler, with dark fuscous terminal band of forewings and small spots before termen of hindwings. Wings beneath blue-whitish; an indistinct mark, two anterior spots of hindwings, and a postmedian series black, white-ringed.

England, Ireland, rather local; Europe, N. and WC. Asia, N. Africa; 4, 5, 8. Larva green, yellowish-dotted; interrupted dorsal line and one or more series of spots sometimes rosy-pink or black; subspiracular sometimes yellow-whitish; head brown: on flowers and young leaves of holly, *Hedera*, *Rhamnus*, and *Cornus;* 5, 6, 8, 9. Pupa attached by tail and central belt.

3. **L. corydon**, *Pod.* 30-37 mm. Wings in ♂ pale shining blue, with dark fuscous terminal fascia enclosing series of whitish rings; in ♀ dark iridescent brown, base sprinkled with pale blue, a terminal series of faint pale rings, in hindwings anteriorly orange, forewings with darker discal mark; cilia barred. Wings beneath whitish to brown, browner in ♀; discal spot, two anterior spots of forewings and four of hindwings, and a postmedian series black, white-ringed; a terminal series of white rings, anteriorly orange at least on hindwings and dark-edged, enclosing dark fuscous dots.

England to Cumberland, usually on chalk or limestone, local; C. and S. Europe, Asia Minor; 7, 8. Larva green, with light brown hairs; dorsal line darker; subdorsal yellow, interrupted; subspiracular yellow; spiracles black; head dark brown: on *Hippocrepis*, *Lotus*, *Anthyllis*, etc.; 5, 6. Pupa unattached, sometimes subterranean.

4. **L. bellargus**, *Rott.* (*adonis*, Hb.) 27-37 mm. Wings in ♂ bright lilac-blue, terminal edge black, cilia barred; in ♀ as in *L. corydon*, but blue scales somewhat darker. Wings beneath as in *L. corydon*, but ground colour always brownish.

S. England to Cambridge and Gloucester, local; C. and S. Europe, WC. Asia, N. Africa; 5, 6, 8, 9. Larva as in *L. corydon*, but brighter, hairs black: on *Hippocrepis*, *Trifolium*, etc.; 7, 9-4. Pupa unattached, sometimes subterranean.

5. **L. aegon**, *Schiff.* 25-30 mm. Wings in ♂ purple-blue, with a suffused dark fuscous terminal streak; in ♀ dark iridescent fuscous, with a subterminal series of suffused orange crescentic spots. Wings beneath pale ochreous-grey or light brownish; discal spot, three anterior spots of hindwings, and a postmedian series black, white-ringed; a double series of dark fuscous whitish-ringed spots before termen,

enclosing orange spots sometimes obsolete on forewings, posterior spots on hindwings partly marked with pale metallic blue.

Britain to Aberdeen, E. Ireland, local; Europe, WC. Asia to N. Persia; 7, 8. Larva green; dorsal line blackish-brown, whitish-edged, dilated on 3, 4, 11; lateral yellowish, edged with darker green; subspiracular whitish; head blackish: on *Ornithopus;* 3-6. Pupa usually unattached, sometimes subterranean.

6. **L. icarus**, *Rott.* (*alexis*, Hb.) 27-35 mm. Wings in ♂ bright purple-blue, terminal edge blackish; in ♀ dark fuscous, more or less suffused with deep purple-blue, sometimes with subterminal series of orange spots. Wings beneath as in *L. aegon*, but forewings with two additional anterior spots.

Britain to the Orkneys, Ireland, common; Europe, N. and WC. Asia, N. Africa; 5-8. Larva green; dorsal line darker; subdorsal sometimes whitish-green; three lateral series of oblique pale streaks; subspiracular whitish-green; head blackish: on *Ononis*, *Lotus*, *Medicago*, etc.; 6, 7, 9-4. Pupa suspended by tail only, or unattached.

7. **L. arion**, *L.* 35-43 mm. Wings purple-blue sprinkled with black, costa and termen suffused with dark fuscous; forewings with discal mark and curved postmedian series of three to six spots black. Wings beneath pale ochreous-grey; discal mark, one anterior spot of forewings and three of hindwings, and a postmedian series black, whitish-ringed; a double series of spots before termen, anterior black, posterior dark fuscous.

S. England to Northampton and Worcester, always local, now scarce and nearly extinct except in SW.; Europe (except SW.), Asia Minor, NW. Asia; 6, 7. Larva when young on flowers of *Thymus*, but perhaps changing later to some other plant; 8-4.

5. PIERIDAE.

Eyes glabrous. Anterior legs fully-developed; posterior tibiae without middle-spurs. Forewings: 7, 8, 9 stalked or coincident. Hindwings with or without praecostal spur.

A family of considerable extent, generally distributed, but more numerous in tropical regions. The species are of moderate or large size, usually coloured with white, black, yellow, and sometimes red.

Ovum long, subcylindrical, ribbed. Larva rather elongate, somewhat attenuated at extremities, usually with more or less close short hairs. Pupa with the head more or less pointed, attached by the tail and a central belt of silk.

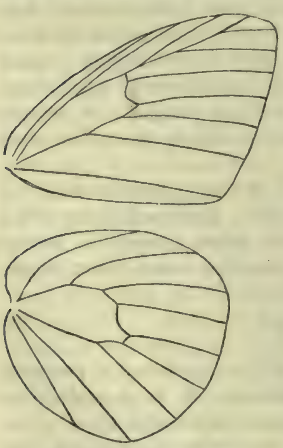
Colias and *Gonepteryx* are nearly correlated, and so are *Pieris* and *Aporia*; the other two genera have no immediate connection either with these or with each other.

TABULATION OF GENERA.

1.	Hindwings without praecostal spur	2.
	„ with praecostal spur	3.
2.	Forewings with 10 out of 9	1. COLIAS.
	„ „ 10 separate	2. GONEPTERYX.
3.	Forewings with 9 present	4.
	„ „ 9 absent	5.
4.	Forewings with 10 and 11 out of 7	4. LEUCOPHASIA.
	„ „ 10 and 11 separate	3. EUCHLOE.
5.	Club of antennae abrupt	5. PIERIS.
	„ „ elongate, gradual	6. APORIA.

1. COLIAS, *F.*

Club of antennae abrupt. Forewings: 6 and 8 out of 9, 7 absent, 10 out of 9. Hindwings without praecostal spur.



Neuration of *Colias edusa*.

A considerable genus, occurring through most of the Northern hemisphere and in Africa. The imago has a very bold and strong flight. When at rest, the under side of the hindwings closely resembles a faded clover-leaf with a central fungus-spot.

Terminal band of forewings broad on dorsum 2. *edusa*.
Terminal band of forewings hardly reaching dorsum 1. *hyale*.

1. **C. hyale**, *L.* 40-52 mm. Head and antennae rosy-tinged. Forewings yellow-whitish, towards base black-sprinkled; a black discal spot; a black terminal band, very broad on costa, hardly reaching dorsum, enclosing a series of several pale spots. Hindwings yellow-whitish, black-sprinkled; a light orange

discal spot; a narrow interrupted sometimes nearly obsolete blackish terminal fascia. Hindwings and apical blotch of forewings beneath yellow; discal spot of hindwings silvery-white, brown-ringed.

England to Cumberland, very irregular in appearance, probably not a permanent resident but occasionally immigrating in numbers and then maintaining itself for a generation or two; C. and S. Europe, W. Asia, N. Africa; 7, 8, seldom 9-5. Larva rather deep green, black-dotted; spiracular line white, yellow-marked: on *Trifolium*, *Lotus*, etc.; 10-5.

2. **C. edusa**, *F.* 43-56 mm. Head and antennae rosy-tinged. Forewings orange, in ♀ sometimes whitish-yellow, towards base black-sprinkled; a black discal spot; a broad black terminal band throughout, in ♀ enclosing a series of several pale spots. Hindwings as forewings, but more black-sprinkled, discal spot large, deep orange, terminal band narrower, not reaching dorsum. Wings beneath as in *C. hyale.*

Britain to the Clyde (rarely stragglers further north), Ireland, irregular in appearance, sometimes common; C. and S. Europe, N. and WC. Asia, Japan, N. Africa; 6, 8, 9. Larva rather deep green, black-dotted; spiracular line yellow or whitish, spotted with pink; spiracles black; head green: on *Trifolium*, *Lotus*, *Melilotus*, etc.; 7, 10-4.

2. GONEPTERYX, *Lch.*

Characters of *Colias*, but forewings with 10 separate.

Restricted to two or three closely allied or doubtfully distinct species of the European region. Imago with apex of forewings subfalcate, hindwings with submedian terminal angular projection.

1. **G. rhamni**, *L.* 55-67 mm. Face and antennae rosy-tinged. Forewings in ♂ clear yellow, in ♀ yellow-whitish; base blackish; an orange discal dot. Hindwings as forewings, but discal dot larger. Wings beneath paler, more greenish-tinged, discal dots red-brownish, pale-centred; hindwings with subterminal row of red-brownish dots.

England to Cumberland, W. and S. Ireland, common; Europe, N. and WC. Asia, N. Africa; 7-6. Larva dull green, irrorated with black; spiracular line whitish or yellowish: on *Rhamnus;* 6, 7.

3. EUCHLOE, *Hb.*

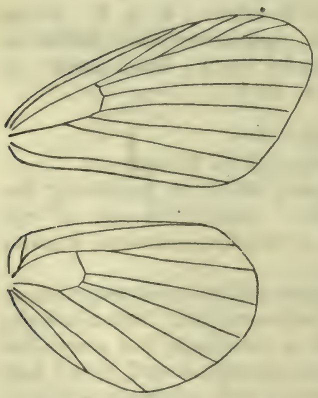
Club of antennae abrupt. Forewings: 6 and 7 out of 8, 9 out of 8, 10 separate. Hindwings with praecostal spur.

A rather considerable genus, occurring through most of the Northern hemisphere. Pupa angulated in middle, thence attenuated to a long narrow point at both extremities; apparently protectively adapted to rest against the stem of its food-plant without causing an abrupt prominence.

1. **E. cardamines**, *L.* 41-48 mm. Forewings white, towards base blackish; apical $\frac{2}{5}$ in ♂ bright orange; a black discal spot; a blackish apical blotch, more or less produced along termen. Hindwings white, towards base blackish. Hindwings beneath and apical blotch of forewings yellow-greenish densely irrorated with black, former with several series of white spots, latter whitish-suffused.

Britain to Caledonian Canal, Ireland, common; Europe, N. and WC. Asia; 5, 6. Larva dull bluish-green; dots black; spiracular line white: on *Sinapis*, *Cardamine*, *Sisymbrium*, etc., especially on the seed-pods, which it closely resembles; 6-8.

4. LEUCOPHASIA, *Stph.*



Neuration of *Leucophasia sinapis.*

Club of antennae abrupt. Forewings: 6 separate, 8, 9, 10, 11 out of 7. Hindwings: 6 and 7 stalked, 5 rising nearer to 4.

A very small genus, inhabiting Europe and Asia. Pupa broadest in middle, thence attenuated to a point at each end.

1. **L. sinapis**, *L.* 35-41 mm. Forewings white; base irrorated with blackish; an apical blackish blotch irrorated with whitish. Hindwings white; base irrorated with blackish. Hindwings beneath irregularly clouded with light grey.

England to Cumberland, W. and S. Ireland, local; Europe, N. and WC. Asia; 5-8. Larva green; dorsal line dark green; spiracular yellow: on *Vicia* and *Lathyrus*; 6-9.

5. PIERIS, *Schrk.*

Club of antennae abrupt. Forewings: 6 out of 8, 7 out of 8 near apex or absent, 9 absent, 10 separate.

A large genus of nearly universal distribution, absent from New Zealand.

1. Hindwings beneath dull greenish, white-spotted
1. *daplidice.*
,, ,, not spotted . . . 2.
2. Veins of hindwings beneath edged with dark shading
2. *napi.*
,, ,, not dark-shaded . . 3.
3. Apical blotch of forewings reaching middle of termen
4. *brassicae.*
,, ,, ,, not reaching middle of termen . 3. *rapae.*

1. **P. daplidice**, *L.* 37-48 mm. Forewings creamy-white, towards base black-sprinkled; a black discal spot, and sometimes a subdorsal posterior spot; an apical black blotch, reaching middle of termen, containing a series of four white spots. Hindwings creamy-white, towards base black-sprinkled; in ♀ confluent subterminal and terminal series of blackish spots. Hindwings and apical blotch of forewings beneath pale dull greenish, black-sprinkled, with series of white spots.

S. England to Worcester and Cambridge, an occasional immigrant only; Europe, N. and WC. Asia, Japan, N. Africa; 8. Larva bluish-grey, with numerous black spots and dots; subdorsal and spiracular lines deep yellowish or partly whitish; head yellowish, black-dotted: on *Reseda* and various *Cruciferae;* 6, 7.

2. **P. napi**, *L.* 37-48 mm. Forewings creamy-white, towards base irrorated with black; an apical blackish blotch, sometimes broken into several terminal spots; a black spot between 3 and 4, in ♂ sometimes absent; in ♀ a black subdorsal posterior spot, and dorsal confluent mark. Hindwings creamy-white, base black-sprinkled; a black costal spot before apex, in ♂ sometimes absent. Hindwings and apex of forewings beneath pale yellow; veins edged with a shading of fine black lines, in hindwings more broadly.

Britain to Ross, Ireland, common; Europe, N. and WC. Asia, N. America; 5-8. Larva green, irrorated with black; spiracular line pale, marked with yellow spots enclosing black spiracles: on *Nasturtium*, *Barbarea*, *Brassica*, etc.; 7, 9, 10. The male can emit a perfume resembling lemon-scented mint.

3. **P. rapae**, *L.* 46-54 mm. Differs from *P. napi* as follows: forewings with apical blotch entire, not reaching middle of termen, wings beneath without black shading along veins, hindwings beneath finely sprinkled with black.

Britain to the Shetlands, Ireland, very common; Europe,

N. and WC. Asia, Japan, N. Africa, N. America; 4-8. Larva greyish-green, irrorated with black; dorsal and spiracular lines yellow: on *Brassica*, *Tropaeolum*, *Reseda*, etc.; 6-10. The pupa possesses a well-marked power (apparently photographic) of adapting its colour to its surroundings when first formed.

4. **P. brassicae**, *L.* 56-66 mm. Forewings creamy-white; base and costa irrorated with black; a black apical blotch, reaching to below middle of termen; in ♀ two black postmedian spots in disc and near dorsum, and a black elongate dorsal median spot. Hindwings creamy-white, towards base black-sprinkled; a small black costal spot before apex, in ♂ sometimes absent. Hindwings and apical blotch of forewings beneath light yellowish, hindwings finely black-sprinkled.

Britain to the Shetlands, Ireland, very common; Europe, N. and WC. Asia, Japan, N. Africa; 5, 6, 8. Larva grey-green or blue-green, with black spots and dots; dorsal and spiracular lines yellow: on *Brassica*, *Tropaeolum*, *Reseda*, etc.; 7, 9, 10. Sometimes this species appears as an immigrant in large swarms from the Continent.

6. APORIA, *Hb.*

Club of antennae gradual. Forewings: 6 and 7 out of 8, 9 absent, 10 separate. Hindwings with praecostal spur.

One other species occurs in NE. Asia.

1. **A. crataegi**, *L.* 60-69 mm. Forewings dull white; veins marked by blackish lines, transverse vein thickened; terminal extremities of veins broadly suffused with fuscous. Hindwings dull white; veins marked by blackish lines.

S. England to Merioneth and Norfolk, always local but formerly plentiful in many places, now very scarce, and seemingly extinct except in Kent and S. Wales; Europe, N. and WC. Asia, Japan, N. Africa; 6, 7. Larva blackish; subdorsal line broad, ochreous-reddish; spiracular region broadly grey, sometimes purplish or greenish-tinged; dots whitish; head and plate of 2 blackish: feeding gregariously in a white web on hawthorn, blackthorn, cherry, etc.; 8-5.

6. PAPILIONIDAE.

Anterior legs fully developed; posterior tibiae without middle-spurs. Forewings: 7 and 8 stalked. Hindwings with praecostal spur present, 1a absent.

This group consists of only a few genera, though *Papilio* itself is very rich in species. Most of the insects contained in it are of large size, variously but often splendidly coloured.

Ovum spherical, smooth. Larva stout, with few hairs. Pupa attached by the tail and a central belt of silk.

Besides the following, four other species (*Papilio podalirius*, L.; *Thais rumina*, L.; *Parnassius apollo*, L., and *P. delius*, Esp.) have been taken in Britain, but there is practically no doubt that all were artificially introduced as larvae or pupae.

1. Papilio, *L.*

Eyes glabrous. Club of antennae abrupt. Forewings: transverse vein angulated on 5, 8 out of 7, 9 connate with 7. Hindwings with deep hairy dorsal groove beneath.

An exceedingly large genus, principally inhabiting tropical regions; only four species occur in Europe proper. The large size of the imagos, and their elegant shape and colouring cause this to be perhaps the most attractive group of the *Lepidoptera*. Larva with retractile extensible forked tentacle on back of 2, which emits a strong penetrating odour, as of decayed pineapple.

1. **P. machaon**, *L.* 72-100 mm. Forewings light dull yellow; veins broadly black; a large black basal patch irrorated with yellow; three black transverse blotches beneath costa posteriorly; a black subterminal band, often irrorated with yellow; a narrow black terminal fascia. Hindwings with colour, narrow basal patch, and terminal fascia as in forewings; veins slenderly black; a black subterminal band, enclosing spots of light blue irroration, and a round dull red tornal spot; termen dentate, with very long narrow projection on 4.

England to York, always local, now extinct except in the fens of Norfolk, Cambridge, and Hunts, where it is still locally common; Europe, N. and WC. Asia, N. Africa; 5-8. Larva pale green; incisions deep purplish, black-edged; a black transverse median bar on each segment, bearing six orange tubercles; tentacle pinkish-red; head yellow, black-marked: on *Peucedanum*, *Heracleum*, *Angelica*, etc.; 6-8.

7. HESPERIADAE.

Eyes glabrous. Club of antennae large, strong; basal joint with long hair-tuft. Anterior legs fully developed; posterior tibiae usually with middle-spurs. Forewings: all veins separate. Hindwings: 5 absent.

An extremely large family, generally distributed but absent from New Zealand, most abundant within the tropics. The species are usually rather small, and very similar in general appearance; their flight is bold and rapid, and often difficult to follow even with the eye.

Ovum spherical or oval, flattened beneath, smooth or reticulated, sometimes ribbed. Larva moderately stout, attenuated towards extremities, with few hairs, head relatively large, broader than 2. Pupa in a slight cocoon, or attached by tail and a central belt of silk.

Cyclopaedes may be regarded as an offshoot of *Pamphila;* but *Hesperia* has no near connection with either of these.

TABULATION OF GENERA.

1. Posterior tibiae without middle-spurs	2. CYCLOPAEDES.
„ „ with middle-spurs . .	2.
2. Forewings in ♂ with costal fold . .	1. HESPERIA.
„ „ without costal fold .	3. PAMPHILA.

1. HESPERIA, *F.*

Abdomen in ♂ sometimes with basal cavities and projections. Posterior tibiae with middle-spurs, in ♂ sometimes with basal hair-pencil. Forewings in ♂ with costal fold; 5 from middle of transverse vein.

A genus of some extent, inhabiting the Northern hemisphere and Africa, probably of European origin; the various species differ in the secondary sexual characteristics of the ♂. Pupa in a slight cocoon between drawn-together leaves.

Wings with subquadrate clear white spots .	1. *malvae.*
„ without such spots . . .	2 *tages.*

[Several specimens of *H. alveus*, Hb., a common European species resembling *malvae* but larger, hindwings without white spots above but with two series of obscure pale marks, are said to have been taken in Norfolk about 1860; they were not identified until 30 years afterwards, and as it does not appear that they were labelled, the probability of an error of memory makes it hardly worth while to conjecture whether they were casual immigrants or artificially introduced.]

1. **H. malvae,** *L.* (*alveolus*, Hb.) 20-27 mm. Forewings

blackish; posterior $\frac{2}{3}$ with numerous creamy-white subquadrate spots; cilia white, with blackish bars. Hindwings as forewings, but spots forming two series. Hindwings beneath suffusedly irrorated with yellow-ochreous, with three additional white spots towards base.

Britain to Sutherland, local, common in S. England; Europe, Asia Minor to Syria, N. Asia; 5, 6. Larva pale ochreous-green or brownish, dorsally reddish-tinged; dorsal, subdorsal, and spiracular lines somewhat paler greenish; head dark purplish-brown: on *Potentilla* and *Rubus*, drawing the leaves together; 6-9.

2. **H. tages,** *L.* 25-31 mm. Forewings fuscous; two darker bands of confluent spots, included space irrorated with whitish, second followed by a series of small spots of whitish irroration; a terminal row of whitish dots. Hindwings dark fuscous; a discal mark, and postmedian and terminal series of dots whitish. Wings beneath pale ochreous-brownish, pale dots indistinct.

Britain to Ross, N. and W. Ireland, common; Europe, N. and W. Asia; 5, 6. Larva dull green; dorsal line darker; subdorsal and spiracular obscurely paler; head purple-blackish: on *Lotus corniculatus*, drawing the leaves together; 6-4.

2. CYCLOPAEDES, *Hb.*

Posterior tibiae without middle-spurs. Forewings in ♂ without costal fold; 5 from middle of transverse vein.

A group of limited extent but widely distributed. Pupa attached by tail and central belt of silk.

1. **C. palaemon,** *Pall.* (*paniscus*, F.) 26-29 mm. Forewings dark fuscous; three or four subconfluent spots in disc before middle, and an irregular posterior series orange; a subterminal series of indistinct spots of orange irroration. Hindwings dark fuscous; a roundish discal spot before middle, two beyond middle, and a subterminal series of small spots orange. Hindwings beneath orange-irrorated, spots paler, two additional spots above and below middle.

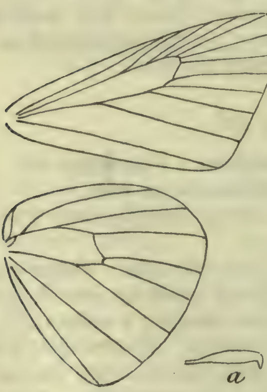
Hants and Suffolk to Merioneth and Lincoln, always local, now more restricted and mainly in Lincoln and Northampton; C. Europe, Asia Minor, N. Asia; 5, 6. Larva green; subdorsal line yellowish, darker-edged; lateral pale; spiracular faintly pale; head green (after hibernation the green colour becomes reddish-brown, head more blackish): on *Brachypodium sylvaticum*, drawing the leaves into tubular chambers; 7-4.

3. Pamphila, *F.*

Posterior tibiae with middle-spurs. Forewings in ♂ without costal fold, with raised streak of scales beneath cell; 5 sometimes rather approximated to 4.

An extremely large genus, almost universally distributed, very numerous within the tropics. Larva with two conspicuous white wax-like spots on ventral surface of 10 and 11. Pupa in a slight open network cocoon.

1. Hindwings beneath with pale postmedian spots 2.
„ „ without pale spots . . 3.
2. Spots of hindwings ochreous-white . 5. *comma.*
„ „ not white . . 4. *sylvanus.*
3. Forewings with pale postmedian spots . 3. *actaeon.*
„ without such spots . . . 4.
4. Antennae black towards apex beneath . 2. *lineola.*
„ not black towards apex beneath 1. *thaumas.*



Neuration of *Pamphila sylvanus*; *a*, club of antenna.

1. **P. thaumas,** *Hufn.* (*linea*, F.) 25-31 mm. Antennae beneath whitish-ochreous, without apical hook. Forewings brownish-orange; veins blackish except in disc; costa and termen narrowly blackish; in ♂ a hardly curved black streak obliquely placed below middle of disc. Hindwings as forewings, but blackish-mixed towards base, without black streak. Hindwings beneath orange-ochreous, somewhat brown-sprinkled, more orange towards tornus.

England to York, E. and S. Ireland, rather local; Europe, WC. Asia to N. Persia, N. Africa; 7-8. Larva green; dorsal line double, bluish-green, pale-edged; subdorsal pale; subspiracular whitish; head green: on *Holcus*, *Brachypodium*, etc.; 8-6.

2. **P. lineola,** *O.* 25-28 mm. Differs from *H. thaumas* as follows: antennae beneath black towards apex; forewings in ♂ with black streak more oblique, directed towards base of dorsum, often more indistinct; hindwings beneath without orange tornal blotch.

Kent and Sussex to Suffolk and Hants, local; Europe, N.

and WC. Asia, N. Africa; 7, 8. Larva green; dorsal line darker green; subdorsal and subspiracular yellowish; head pale yellowish, brown-marked: on *Triticum*, etc.; 4-6. Only recognised as British since 1888, and may range more widely than has been observed.

3. **P. actaeon,** *Esp.* 23-27 mm. Antennae without apical hook. Forewings dark fuscous, densely irrorated with brownish-orange; an elongate discal blotch before middle, and a curved postmedian series of spots in upper half of disc orange, more distinct in ♀; in ♂ a hardly curved black streak obliquely placed below middle of disc. Hindwings dark fuscous, irrorated with brownish-orange. Hindwings beneath lighter, more suffused with orange, especially towards tornus.

Dorset to Cornwall, on or near coast, local; C. and S. Europe, Asia Minor, N. Africa; 7, 8. Larva pale greyish-green; dorsal line double, darker, edged with pale yellowish; subdorsal and subspiracular yellowish; head pale brown, yellowish-marked: on *Brachypodium pinnatum* and *Calamagrostis;* 4-6.

4. **P. sylvanus,** *Esp.* 27-33 mm. Antennae with short apical hook. Forewings dark fuscous, very closely irrorated with brownish-orange except on veins and termen; anterior half in ♂ wholly brownish-orange, with a strong blackish oblique streak beneath middle of disc; a discal spot and postmedian irregular series brownish-orange. Hindwings with colour and postmedian spots as in forewings, but spots absent on dorsal third. Hindwings beneath greenish-ochreous-yellow, with pale postmedian spots and orange tornal blotch.

Britain to the Clyde, E. Ireland, common, scarcer northwards and in Ireland; Europe, N. and WC. Asia; 6-8. Larva pale bluish-green; dorsal line darker; subspiracular pale; head brown: on *Luzula*, *Dactylis*, *Triticum*, etc.; 8-5.

5. **P. comma,** *L.* 27-33 mm. Antennae with minute apical hook. Forewings dark fuscous; in ♂ basal $\frac{3}{5}$ suffused with brownish-orange, in ♀ a discal anterior brownish-orange suffusion; a postmedian irregular series of pale brownish-orange spots; in ♂ a strong submetallic blackish-grey oblique streak in disc anteriorly. Hindwings dark fuscous, orange-tinged; an indistinct discal spot and postmedian series orange. Hindwings beneath densely strewn with yellowish scales; two anterior spots and a postmedian series ochreous-white.

S. England to Norfolk and Stafford, especially on chalk, local; Europe, N. and WC. Asia; 8. Larva dull green; head black: on *Lotus*, *Ornithopus*, *Coronilla*, etc.; 4-6.

5. PYRALIDINA.

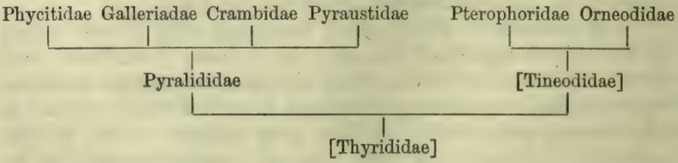
Tongue and maxillary palpi usually developed. Forewings: 1b usually simple, sometimes shortly furcate at base, 1c sometimes present, 5 rising below middle of transverse vein, usually approximated to 4, 8 and 9 stalked (except *Agdistis*), 11 from beyond middle of cell. Hindwings with frenulum, 1c present, 8 rising free, approximated or anastomosing with 7 beyond cell, thence diverging.

The insects which are comprised in this large group are usually remarkable for their slender build, and relatively long and thin legs; the forewings are more or less elongate-triangular, sometimes extremely elongate and narrow, the hindwings usually relatively broad, ovate; but in the genera with cleft wings the shape is necessarily much modified.

Type of markings: Forewings with three transverse lines, viz. first, second, and subterminal, and three small spots in disc, viz. a usually dot-like antemedian called the orbicular, a similar one beneath it called the claviform but very seldom perceptible, and a postmedian (variably 8-shaped, transverse-linear, or dot-like) called the discal spot or mark. Hindwings with a discal spot and similar lines, but first line usually absent, all markings very often obsolete.

Larva more or less elongate, with 10 prolegs, usually with few hairs. Pupa with segments 9-11, sometimes also 8 and in ♂ 12 free (*Pterophoridae* and *Orneodidae*); not protruded from cocoon in emergence.

Phylogeny of Pyralidina.



The British representatives are inadequate to illustrate satisfactorily the phylogeny of the group. In the accompanying diagram two exotic families are included (in brackets), to explain the connection of the others; it may also be mentioned that the *Phycitidae* are developed from the *Epipaschia* group of the *Pyralididae*, which, though of considerable extent, does not occur at all in Europe, and the *Galleriadae* from another group of *Pyralididae*, which is principally characteristic of S. America. Of the two additional exotic families mentioned, the *Thyrididae* are fairly numerous, but chiefly found within the tropics; the *Tineodidae* are a singular group, now very small and fragmentary, apparently confined to Australia. The ancestral family *Thyrididae* is undoubtedly derived from the *Heterogeneidae*.

Tabulation of Families.

1.	Forewings six-cleft	7. ORNEODIDAE.
	,, not six-cleft	2.
2.	Hindwings with defined pecten of hairs on lower margin of cell towards base	3.
	,, without such pecten	5.
3.	Forewings with vein 7 absent	1. PHYCITIDAE.
	,, ,, vein 7 present	4.
4.	Maxillary palpi triangularly scaled	3. CRAMBIDAE.
	,, ,, not triangular	2. GALLERIADAE.
5.	Wings cleft, or if entire, 8 and 9 of forewings separate	6. PTEROPHORIDAE.
	,, entire, 8 and 9 of forewings stalked	6.
6.	Forewings with vein 7 rising out of 8	5. PYRALIDIDAE.
	,, vein 7 separate	4. PYRAUSTIDAE.

1. PHYCITIDAE.

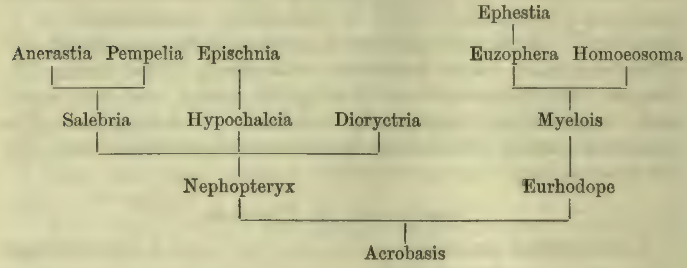
Ocelli usually developed. Maxillary palpi present, not triangular. Forewings: 1b simple or obsoletely furcate, 4 and 5 closely approximated or stalked, 7 absent (coincident with 8). Hindwings with defined pecten of hairs on lower margin of cell, 4 and 5 closely approximated or stalked or coincident, 7 out of 6 near origin, anastomosing with 8 or very closely approximated.

The family is extremely large, but more developed in warm regions than cool ones. Imago with forewings more or less elongate, often very narrow. The species are usually strictly nocturnal in habit, and many are not very readily met with.

Ovum flattened-oval, surface granulated, sometimes ribbed. Larva more or less elongate, with few hairs, usually with a more conspicuous ocellated lateral spot on 3; generally living in a silken gallery amongst its food-plant. Pupa usually in a cocoon above ground.

The relations of the chief genera are shown in the diagram.

Phylogeny of Phycitidae.


Ephestia
Anerastia
Pempelia
Epischnia
Euzophera
Homoeosoma
Salebria
Hypochalcia
Dioryctria
Myelois
Nephopteryx
Eurhodope
Acrobasis

Tabulation of Genera.

1. Hindwings with 4 and 5 approximated . . 2.
„ „ 4 and 5 stalked or coincident . 4.
2. Basal joint of antennae in ♂ with horny tooth
21. Acrobasis.
„ „ „ without tooth . . 3.
3. Antennae in ♂ with hook on suprabasal joint
20. Cryptoblabes.
„ „ without hook . 19. Eurhodope.
4. Forewings with 5 absent . . . . 5.
„ „ 5 present . . . 7.
5. Forewings with 9 absent . . . . 6.
„ „ 9 present . . 1. Anerastia.
6. Labial palpi porrected . . . 11. Plodia
„ „ ascending . . . 12. Ephestia.
7. Forewings with 9 absent . . 16. Homoeosoma.
„ „ 9 present . . . 8.
8. Terminal joint of labial palpi longer than second
17. Nyctegretis.
„ „ „ shorter than second 9.
9. Hindwings with 5 absent . . . . 10.
„ „ 5 present . . . 15.
10. Forewings with 4 and 5 stalked . . 11.
„ „ 4 and 5 approximated . . 13.
11. Second joint of labial palpi shortly tufted beneath
5. Alispa.
„ „ „ not tufted . . 12.
12. Cell of hindwings reaching middle 14. Euzophera.
„ „ not reaching middle
13. Heterographis.

13. Maxillary palpi of ♂ with long hair-pencil . 14.
„ „ „ without hair-pencil 15. CATEREMNA.
14. Antennae in ♂ with scale-tuft above base . 3. PEMPELIA.
„ „ without scale-tuft 2. GYMNANCYLA.
15. Labial palpi porrected . . . . 16.
„ „ ascending . . . . 17.
16. Cell of hindwings reaching $\frac{1}{3}$. 7. HYPOCHALCIA.
„ „ nearly reaching middle 6. EPISCHNIA.
17. Antennae in ♂ with tuft in sinuation above base . 18.
„ „ without such structure . . 20.
18. Maxillary palpi in ♂ with long hair-pencil 4. SALEBRIA.
„ „ „ without hair-pencil . . 19.
19. Cell of hindwings not reaching $\frac{1}{3}$ . . 9. PHYCITA.
„ „ nearly reaching middle 10. NEPHOPTERYX.
20. Forewings with 4 and 5 stalked . . 18. MYELOIS.
„ „ 4 and 5 approximated . . 21.
21. Cell of hindwings reaching $\frac{1}{3}$. 8. DIORYCTRIA.
„ „ reaching middle 19. EURHODOPE.

1. ANERASTIA, *Hb.*

Face with rounded horny prominence. Tongue short. Antennae in ♂ shortly ciliated, with roughened sinuation above base. Labial palpi long, straight, porrected, second joint densely scaled, rough above, terminal moderate, obtuse. Maxillary palpi rudimentary. Forewings: 5 absent. Hindwings: cell not reaching middle, 3 and 4 stalked, 5 absent, 7 closely approximated to 8 to middle.

A genus of rather limited extent, but very generally distributed in warmer regions. It forms part of a group of allied genera, principally occurring within the tropics, whose development originates from *Salebria*. Imago with forewings narrow, costa moderately arched.

1. **A. lotella**, *Hb.* 19-25 mm. Forewings whitish-ochreous or pale ochreous, usually somewhat reddish-tinged; veins sometimes paler, often sprinkled with fuscous or dark fuscous; an evenly broad costal streak sometimes paler or distinctly rosy-whitish; often two indistinct fuscous transversely placed discal dots. Hindwings ochreous-grey-whitish to light grey.

England to York, E. Ireland, mainly on sandy coasts, local; C. Europe, WC. Asia to Turkestan; 7. Larva pale orange-yellow; dorsal line faintly reddish; head pale reddish-brown: in a tubular case covered with sand, amongst stem-bases of

Ammophila, *Aira*, *Festuca*, etc.; 5, 6. On the Continent this larva has sometimes been exceedingly destructive to rye.

2. GYMNANCYLA, *Z.*

Face smooth. Antennae in ♂ shortly ciliated, with sinuation above base. Labial palpi rather long, porrected, with dense appressed scales, terminal joint short, hardly pointed. Maxillary palpi in ♂ terminating in a long pencil of hairs, in ♀ moderate, tolerably filiform. Forewings: 4 and 5 rather approximated. Hindwings: cell not reaching middle, 3 and 4 stalked, 5 absent, 7 closely approximated to 8 to near middle.

Contains only the one species. Imago with forewings narrow, costa hardly arched.

1. **G. canella**, *Hb.* 21-23 mm. Forewings greyish-ochreous, terminally whitish-sprinkled; a pale suffused costal streak; first line hardly pale, edged posteriorly by three dark fuscous dots on veins; two dark fuscous transversely placed discal dots; second line pale, edged anteriorly with some dark fuscous scales, posteriorly with pale rosy-ochreous. Hindwings light grey.

Kent to Dorset and Suffolk, E. Ireland, on coasts, local; C. Europe; 6, 7. Larva blue-green to reddish-grey; dorsal line dark green or rosy; subdorsal and supraspiracular pale; 3 and 12 with pale pinkish-ochreous black-ringed lateral spots; head pale brownish-ochreous, blackish-marked: mining in stem until nearly full-grown, finally in a slight web on *Salsola kali*; 8, 9.

3. PEMPELIA, *Hb.*

Face with rounded-conical projection of scales. Antennae in ♂ shortly ciliated, with sinuation above base, filled with dense projecting scales. Labial palpi moderately long, ascending, with tolerably appressed scales, terminal joint short, hardly pointed. Maxillary palpi in ♂ terminating in a long pencil of hairs, in ♀ moderate, tolerably filiform. Forewings: 4 and 5 approximated. Hindwings: cell not reaching middle, 3 and 4 stalked, 5 absent, 7 closely approximated or anastomosing with 8 to near middle.

A rather generally distributed genus of limited extent. Imago with forewings narrow, costa scarcely arched.

Forewings more or less mixed with crimson .	1. *dilutella.*
,, not mixed with crimson . .	2. *ornatella.*

1. **P. dilutella**, *Hb.* (*adornatella*, Tr.; *subornatella*, Dup.)

17-21 mm. Forewings ferruginous-ochreous, more or less suffusedly mixed with dull crimson and sometimes in disc with blackish; costal half and sometimes a subbasal fascia suffusedly mixed with white; lines whitish, first dark-edged posteriorly, second on both sides; two black transversely placed discal dots; some indistinct blackish terminal dots. Hindwings fuscous or light fuscous, darker terminally.

Britain to Perth, Ireland, common; C. Europe; 7. Larva greenish-grey, dorsally yellowish-tinged; dorsal and subdorsal lines darker; head and plate of 2 black: in silken galleries amongst *Thymus;* 6.

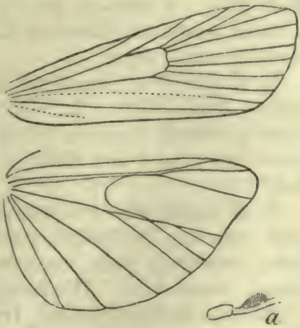
2. **P. ornatella,** *Schiff.* 21-25 mm. Forewings brownish-ochreous; veins and costa suffusedly fuscous, somewhat mixed with white; lines whitish, first interrupted, edged posteriorly with dark spots on veins, second almost straight; two dark fuscous suffusedly whitish-edged transversely placed discal dots. Hindwings fuscous or light fuscous.

S. England to Gloucester and Norfolk, E. Ireland, local; C. Europe, Asia Minor; 7, 8. Larva on *Thymus;* 6.

4. SALEBRIA, *Z.*

Face smooth. Antennae in ♂ ciliated, with sinuation above base, filled with dense projecting scales. Labial palpi moderately long, ascending, with tolerably appressed scales, terminal joint short, hardly pointed. Maxillary palpi in ♂ terminating in a long pencil of hairs, in ♀ moderate, filiform. Forewings: 4 and 5 approximated. Hindwings: cell not reaching middle, 4 and 5 stalked, 7 closely approximated or anastomosing with 8 to middle.

A very large and universally distributed genus, derived from *Nephopteryx.* Imago with forewings elongate, more or less dilated posteriorly, costa slightly or gently arched.



Neuration of *Salebria palumbella;* *a,* base of antenna of ♂.

1. Forewings with transverse lines . . . 2.
,, without transverse lines . 2 *semirubella.*
2. First line in middle . . . 1. *formosa.*
,, considerably before middle . . 3.

3. Lines pale red-brownish . . . 5. *palumbella.*
„ obscurely whitish . . . . 4.
4. Forewings with large scale-tuft before first line
4. *betulae.*
„ without raised scales . . 3. *fusca.*

1. **S. formosa,** *Hw.* 19-21 mm. Forewings fuscous irrorated with grey-whitish, suffused with pale ochreous-reddish, more strongly towards dorsum anteriorly; lines pale, first in middle, strongly blackish-edged, more broadly anteriorly, second edged with dark fuscous suffusion; a transverse blackish discal mark. Hindwings fuscous.

Kent and Sussex to Norfolk, local; C. Europe, WC. Asia to N. Persia; 6, 7. Larva deep green, darker-freckled; dorsal and subdorsal lines darker, edged with greenish-yellowish; lateral greenish-yellowish; spiracular and subspiracular whitish-green; an oval white lateral spot on 3, enclosing a black dot; head green, darker-freckled: on elm, spinning some web on upper surface of leaves; 8, 9.

[*S. adelphella,* F.R., has been regarded as British, but only through a confusion with *Nephopteryx hostilis.*]

2. **S. semirubella,** *Sc.* (*carnella,* L.) 24-27 mm. Forewings light crimson or pink, sometimes much mixed with grey or dark grey; a whitish, greyish-ochreous, or grey costal streak; a broad ochreous-yellowish dorsal suffusion. Hindwings grey, slightly rosy-tinged.

S. England to Somerset and Norfolk, local; C. Europe, N. and C. Asia, Japan; 7. Larva bronzy-blackish, with ten indistinct greenish lines; a whitish lateral spot on 3, including a black dot; head and plate of 2 black: amongst web on *Lotus;* 8-6.

3. **S. fusca,** *Hw.* (*carbonariella,* F.R.) 23-26 mm. Forewings dark fuscous, sprinkled with grey-whitish; first and second lines obscurely pale, darker-edged; two darker transversely placed discal dots. Hindwings fuscous.

Britain to the Hebrides, Ireland, common; N. and C. Europe, Asia Minor, Japan, N. America; 6, 7. Larva brown-blackish, incisions brownish; dorsal line black; head and plate of 2 black: on *Erica;* 7-9. The imago appears to frequent especially those places where the heath has been partly burnt, to which its blackish colouring is adapted.

4. **S. betulae,** *Gz.* 22-25 mm. Forewings dark fuscous, sprinkled with violet-whitish; a rather large spot of raised darker scales above dorsum before first line, anteriorly obscurely

whitish-edged; first and second lines obscurely whitish, dark-edged; two darker transversely placed sometimes confluent discal dots. Hindwings fuscous.

England to York, local; N. and C. Europe; 7. Larva dull black; dorsal line double, pale yellow or yellowish-white; some subdorsal white dots; spiracular pale yellow; subspiracular white; head black, white-marked: beneath a slight web on upper surface of leaves of birch; 5, 6.

[*S. obductella*, F.R., has been recorded as British, but its alleged capture is discredited.]

5. **S. palumbella**, *F.* 20-26 mm. Forewings violet-brown, more or less sprinkled with whitish and dark fuscous, suffused with whitish towards costa between lines and on apex; first and second lines pale red-brownish, internally black-edged, first angulated, preceded by a small spot of blackish raised scales on fold, second twice indented; a rather oblique black discal mark. Hindwings light fuscous, darker terminally.

Britain to Kirkcudbright, E. Ireland, common; C. and S. Europe, N. and WC. Asia to N. India, N. Africa; 7, 8. Larva dark greenish-grey, reddish-tinged; dorsal line brownish, pale-edged; subdorsal double, lighter brownish; head reddish-brown: in tubular webs on *Erica* and *Polygala*; 9-5.

5. ALISPA, *Z.*

Face with conical projection of scales. Antennae in ♂ strongly ciliated, with sinuation above base, basal joint with obtuse apical horny projection, suprabasal joint with two short projections. Labial palpi moderately long, arched, ascending, second joint with short dense projecting apical tuft beneath, terminal rather short, densely scaled, tolerably obtuse. Maxillary palpi moderate, loosely scaled. Forewings: 4 and 5 stalked. Hindwings: cell reaching $\frac{1}{3}$, 3 and 4 stalked, 5 absent, 7 anastomosing with 8 to middle.

Only one species is known. Imago with forewings narrow, costa posteriorly rather strongly arched.

1. **A. angustella**, *Hb.* 19-23 mm. Forewings greyish-ochreous, mixed with reddish-ochreous, somewhat sprinkled with ashy-whitish, with a few black scales, tending to form short dashes in disc; a thick erect bar of blackish raised scales from dorsum before first line, reaching $\frac{3}{4}$ across wing; first line faintly paler, obscurely reddish-edged; second obscure, marked with some short black dashes towards costa; some indistinct

black terminal dots. Hindwings fuscous-whitish, termen fuscous.

Hants and Devon to Hereford, local; C. Europe; 6, 7, 9. Larva dull green or ochreous-yellow; dorsal line darker; lateral and more obscure spiracular series of ferruginous or purplish marks; head brown; 3 with black lateral spot: in berries of *Euonymus*; 8, 10.

6. EPISCHNIA, *Hb.*

Face with rounded-conical projection of scales. Antennae in ♂ minutely ciliated, hardly sinuate above base. Labial palpi long, straight, porrected, elongate-triangularly scaled. Maxillary palpi short, tolerably filiform. Forewings: 4 and 5 approximated. Hindwings: cell nearly reaching ½, 4 and 5 stalked, 7 closely approximated to 8 to middle.

A genus of about forty species, principally inhabiting S. Europe and C. Asia, but also extending into N. America. Imago with forewings narrow, costa little arched.

Forewings with white costal streak . 1. *boisduvaliella.*
„ without such streak . . 2. *bankesiella.*

1. **E. boisduvaliella**, *Gn.* (*farrella*, Curt.) 20-24 mm. Forewings brown, sometimes slightly reddish-tinged, with a few black scales, becoming pale brownish-ochreous towards dorsum; a dorsal streak irrorated with whitish and more or less with blackish; a rather narrow shining white straight streak from base of costa to apex, sometimes black-edged beneath, costal edge above it white-mixed; a black discal dot; termen white-mixed. Hindwings pale fuscous.

Kent to Norfolk, on coast sandhills, local; C. Europe, N. and WC. Asia, N. Africa, N. America; 6-8. Larva reddish, greenish-tinged; three or four obscure paler lines on each side; head brown-reddish: in seedpods of *Anthyllis*, *Ononis*, *Lotus*, etc.; 7-9.

2. **E. bankesiella**, *Rich.* 26-27 mm. Forewings light grey, darker-mixed, especially anteriorly; veins marked with dark grey streaks; dorsum suffused with pale greyish-ochreous towards base; first and second lines indistinctly darker-edged, indented near dorsum, first angulated in middle. Hindwings whitish-fuscous.

Dorset (Portland), scarce and local; not recorded elsewhere; 7.

7. HYPOCHALCIA, *Hb.*

Face with somewhat rounded-projecting scales. Antennae in ♂ minutely ciliated, with thickened and slightly roughened sinuation above base. Labial palpi very long, porrected, with appressed scales, terminal joint moderate, somewhat pointed. Maxillary palpi rather short, tolerably filiform, apex loosely scaled. Forewings: 4 and 5 approximated. Hindwings: cell reaching ⅓, 4 and 5 stalked, 7 closely approximated to 8 to middle.

Includes about thirty nearly allied species, almost confined to C. and S. Europe and C. Asia. Imago with forewings elongate, posteriorly dilated, costa hardly arched. The only known larva of the genus feeds on the roots of *Umbelliferae*.

1. **H. ahenella**, *Hb.* 20-29 mm. Forewings greyish-ochreous or brownish-ochreous, much mixed with dark fuscous, sometimes reddish-tinged; first and second lines cloudy, darker. Hindwings rather dark fuscous.

Britain to the Clyde, on dry grassy banks, rather local; Europe, Asia Minor; 6, 7.

8. DIORYCTRIA, *Z.*

Face smooth. Antennae in ♂ ciliated-dentate, with some rough scales on stalk above base. Labial palpi moderately long, arched, ascending, with appressed scales, terminal joint short, pointed. Maxillary palpi very short, loosely scaled. Forewings: 4 and 5 closely approximated. Hindwings: cell reaching ⅓, 3 sometimes out of 5, 4 and 5 stalked, 7 closely approximated to 8 to middle.

A small genus, ranging over the European region and N. America. Imago with forewings narrow, rather dilated, costa moderately arched, termen little oblique.

First line preceded by a light reddish-brown fascia 1. *splendidella*.
„ without such fascia . . 2. *abietella*.

1. **D. splendidella**, *HS.* (*sylvestrella*, Rag.) 28-32 mm. Forewings silvery-grey, blackish-sprinkled; first and second lines strongly blackish-edged, first preceded by a light reddish-brown fascia becoming blackish towards costa and blackish-edged anteriorly; a light discal spot, preceded and followed by dark fuscous suffusion. Hindwings light fuscous, darker terminally.

Norfolk, Cheshire, local but probably overlooked; C. and SW. Europe, Japan, presumably also in intervening regions; 6, 7. Larva pale greenish; dots black; head reddish-brown; plate of 2 blackish-brown: beneath bark of *Pinus sylvestris*, causing a lump of resinous exudation; 4-6.

2. **D. abietella**, *F.* (*decuriella*, Hb.) 24-29 mm. Forewings fuscous, irrorated with whitish and dark fuscous; first and second lines whitish, dark-edged, waved, nearly parallel, hardly oblique; two darker shades rather before and beyond first line, not reaching costa; a small whitish discal spot, suffusedly darker-edged. Hindwings in ♂ whitish-fuscous, in ♀ light fuscous, darker terminally.

Britain to Ross, rather local; N. and C. Europe, Japan, N. America; 6, 7. Larva dark grey or reddish-brown; dorsal line double, pale; lateral and spiracular lines pale; head and plate of 2 dark brown: in shoots of *Pinus sylvestris*, not causing resinous exudation; 4, 5.

9. PHYCITA, *Curt.*

Face smooth. Antennae in ♂ minutely ciliated, with strong sinuation above base, filled with large dense tuft of scales. Labial palpi moderately long, curved, ascending, with appressed scales, terminal joint moderate, pointed. Maxillary palpi short, with scales spreading laterally inwards at apex. Forewings: 4 and 5 approximated. Hindwings: cell not reaching $\frac{1}{3}$, 4 and 5 stalked, 7 closely approximated to 8 to middle.

The species are not numerous; they occur in Europe, Asia, Africa, and the W. Indies. Imago with forewings narrow, somewhat dilated, costa gently arched.

1. **P. spissicella**, *F.* (*roborella*, Zk.) 22-27 mm. Forewings fuscous, mixed or tinged with reddish and sprinkled with grey-whitish, more whitish-suffused towards dorsum between lines; an erect triangular reddish-brown blackish-mixed patch from dorsum before first line, often preceded by a whitish shade; first and second lines pale, internally darker-edged; a curved darker transverse discal mark; some short black dashes on veins near before second line. Hindwings fuscous.

England to York, common; C. and S. Europe; 7, 8. Larva brown-reddish, yellowish-freckled; subdorsal and lateral lines darker; head reddish-brown; 2 black-spotted; a white black-ringed lateral spot on 3: amongst spun leaves of oak; 9-5.

10. NEPHOPTERYX, *Hb.*

Face smooth. Antennae in ♂ ciliated, with sinuation above base, filled with dense projecting scales. Labial palpi moderately long, ascending, with dense tolerably appressed scales, terminal joint moderate, pointed. Maxillary palpi short, loosely scaled. Forewings: 4 and 5 approximated. Hindwings: cell nearly reaching $\frac{1}{2}$, 3 sometimes out of 5, 4 and 5 stalked, 7 closely approximated to 8 to middle.

A considerable genus, of nearly cosmopolitan distribution, but absent from New Zealand; it appears to originate from a form allied to *Acrobasis*. Imago with forewings elongate, more or less dilated, costa gently arched.

Discal dot of forewings double . . 2. *hostilis*.
" " single . . 1. *genistella*.

1. **N. genistella**, *Dup.* (*davisellus*, Newm.) 24-27 mm. Forewings light brownish-ochreous, reddish-tinged, with some scattered blackish scales; veins in disc and on termen suffusedly streaked with whitish; lines hardly paler, internally more or less distinctly blackish-edged, first edged anteriorly by a spot of raised black scales below middle; a blackish discal dot. Hindwings light fuscous.

Hants, Dorset, Wilts, local; France, Spain, Corsica; 7. Larva pale greyish-ochreous; dorsal line blackish-brown; subdorsal and spiracular light reddish-fuscous; lateral broad, blackish-brown; head blackish-brown, freckled with pale ochreous; a lateral grey-whitish black-centred spot on 3 and 12: in a loose web on *Ulex;* 9-6.

2. **N. hostilis**, *Stph.* 21-24 mm. Forewings less elongate, rather dark fuscous, sometimes reddish-tinged, irrorated with whitish; basal area suffused with brown-reddish; lines pale, edged with dark fuscous, first anteriorly broadly edged with blackish except towards costa; two dark fuscous transversely placed discal dots, connected with dorsum by an irregular darker shade. Hindwings fuscous.

Kent, Surrey, Worcester, Hereford, scarce and local; France, Germany; 6. Larva blackish-brown or dark reddish-brown; subdorsal line double, indistinct, pale yellowish or greyish-ochreous; lateral faint, pale ochreous; subspiracular double, whitish or pale yellow; head black, freckled with yellow-ochreous: in a silken tube amongst spun leaves of *Populus tremula;* 7-9.

11. PLODIA, *Gn.*

Face with conical projection of scales. Antennae in ♂ shortly ciliated. Labial palpi moderately long, porrected, with appressed scales, terminal joint rather short, pointed. Maxillary palpi short, filiform. Forewings in ♂ with costal fold beneath, enclosing hair-pencil; 2 and 3 sometimes stalked, 5 absent, 9 absent. Hindwings: cell nearly reaching $\frac{1}{2}$, 3 and 4 connate, 7 anastomosing with 8 to beyond middle.

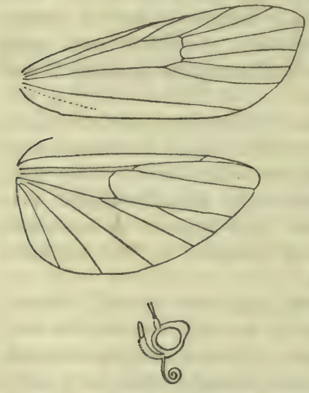
Only one species is known; its habits are similar to those of *Ephestia*. Imago with forewings narrow, costa hardly arched.

1. **P. interpunctella**, *Hb.* 13-18 mm. Forewings ferruginous-ochreous, densely mixed with dark fuscous; basal area wholly whitish-ochreous; first and second lines obscurely dark leaden-fuscous; an obscure paler discal dot. Hindwings whitish-fuscous.

England to Westmoreland, N. and E. Ireland, local; SC. and S. Europe, N. Africa, N. America, Australia, artificially spread, true home uncertain, but perhaps America; 6-10. Larva yellow-whitish; dorsal line darker; head and plate of 2 dark reddish-brown: on maize, figs, seeds, etc.; 8-6.

12. EPHESTIA, *Gn.*

Face smooth. Antennae in ♂ shortly ciliated. Labial palpi moderately long, curved, ascending, with appressed scales, terminal joint moderate, pointed. Maxillary palpi moderate, filiform. Forewings in ♂ sometimes with costal fold beneath towards base, enclosing hair-pencil; 5 absent, 9 absent. Hindwings: cell not reaching ½, 3 and 4 connate or stalked, 5 absent, 7 anastomosing with 8 to beyond middle.



Neuration and head of *Ephestia elutella.*

The species of this genus are few in number, but, owing to their domestic habits, have been so promiscuously distributed through man's agency, that it is now uncertain from what country they were originally derived; it seems, however, not improbable that the majority are Asiatic. Imago with forewings narrow, costa gently arched.

1. First line outwardly oblique on dorsum . . 2.
,, not outwardly oblique on dorsum . 3.
2. Hindwings whitish . . . 5. *kuehniella.*
,, pale fuscous . . . 1. *elutella.*
3. Second line strongly indented near costa . 4. *calidella.*
,, not strongly indented . . 4.
4. Hindwings with subbasal line of cilia strong 3. *cahiritella.*
,, ,, ,, faint 2. *ficulella.*

1. **E. elutella,** *Hb.* (*semirufa,* Hw.; *Roxburghii,* Gregs.) 14-19 mm. Forewings in ♂ less elongate, with costal fold enclosing flocculent scales; grey, sprinkled with whitish and mixed with dark fuscous, towards dorsum often also with ferruginous-reddish; lines pale, dark-edged, first straight, rather oblique, second almost straight; two darker transversely placed discal dots. Hindwings pale fuscous, anteriorly thinly scaled, in ♂ with median and subdorsal whitish-ochreous basal hair-tufts.

England to Cumberland, Ireland, common; Europe, WC. Asia to Turkestan, N. Africa, N. America, Australia; 6-10. Larva brown-whitish; dots brown; head and plate of 2 reddish-brown: on biscuit, chocolate, figs, etc.; 8-4.

2. **E. ficulella,** *Barr.* (? *desuetella,* Walk.) 15-19 mm. Forewings in ♂ with costal fold enclosing long hair-pencil; fuscous, irrorated with whitish, and sprinkled with dark fuscous; lines pale, first somewhat bent, not oblique on dorsum, posteriorly dark-edged and marked with two darker spots, second dark-edged, indented above middle; two dark fuscous transversely placed discal dots. Hindwings subhyaline, fuscous-tinged, veins and termen fuscous, in ♂ with subdorsal whitish-ochreous basal hair-tuft; subbasal line of cilia very faint.

England to York, E. Ireland, local; S. Europe, N. Africa, Australia; 8-10. Larva pinkish-ochreous-whitish; dorsal, subdorsal, spiracular, and subspiracular lines pink; spots dark brown; head and plate of 2 dark brown: on figs, dried currants, etc.; 9-6.

3. **E. cahiritella,** *Z.* (*passulella,* Barr.) 14-20 mm. Forewings in ♂ with costal fold enclosing long hair-pencil; greyish-ochreous or fuscous, irrorated with grey-whitish; lines hardly paler, first slightly bent, not oblique on dorsum, suffusedly dark-edged posteriorly, second very faintly dark-edged, somewhat indented above middle; two indistinct darker transversely placed discal dots. Hindwings subhyaline, fuscous-tinged, veins and termen fuscous, in ♂ with subdorsal whitish-ochreous basal hair-tuft; subbasal line of cilia fuscous, well-marked.

England to York, local; SC. and S. Europe, N. Asia, Japan, N. Africa, America, Australia; 5-10. Larva pinkish-ochreous-whitish; dots dark brown; a black white-centred lateral spot on 3 and 12; head and plate of 2 dark brown: on dried figs, beans, currants, etc.; 7-4.

4. **E. calidella,** *Gn.* (*ficella,* Dgl.; *xanthotricha,* Stgr.) 18-22 mm. Forewings with costa more arched posteriorly, in ♂ with

costal fold small, loosely scaled; fuscous, irrorated with fuscous-whitish and dark fuscous; lines pale, first posteriorly dark-edged, angulated near costa, twice indented beneath, second dark-edged, strongly indented near costa; two dark fuscous transversely placed discal dots. Hindwings fuscous-whitish, termen fuscous, in ♂ with subdorsal whitish-ochreous basal hair-tuft.

Britain to the Clyde, local; France, Spain; 7-10. Larva pinkish-whitish; dorsal line darker; spots brown; head and plate of 2 dark brown: on cork, dried figs, currants, etc.; 9-5.

5. **E. kuehniella,** *Z.* 20-23 mm. Forewings fuscous, irrorated with whitish and sprinkled with dark fuscous; lines hardly paler, first posteriorly dark-edged, nearly straight, rather oblique, serrate-indented above middle and near dorsum, second strongly indented near costa, dark-edged, with darker dots on veins; two blackish transversely placed discal dots. Hindwings whitish, veins and termen fuscous, in ♂ without whitish-ochreous hair-tufts.

Britain to Aberdeen, local; C. Europe, N. America; 7-10. Larva on flour; 8-5.

13. Heterographis, *Rag.*

Face smooth. Antennae in ♂ shortly ciliated. Labial palpi moderate, curved, ascending, with tolerably appressed scales, terminal joint rather short, tolerably pointed. Maxillary palpi rather short, filiform. Forewings: 4 and 5 long-stalked. Hindwings: cell not reaching ½, 3 and 4 long-stalked, 5 absent, 7 closely approximated to 8 to middle.

A group of moderate extent and rather general distribution. Imago with forewings very narrow, costa hardly arched.

1. **H. oblitella,** *Z.* 17-19 mm. Forewings light greyish-ochreous, more or less mixed irregularly with dark fuscous and whitish; lines paler, first posteriorly dark-edged, preceded on dorsum by a suffused dark in ♂ more ochreous or reddish-tinged spot, second interruptedly dark-edged; two dark fuscous transversely placed discal dots. Hindwings whitish-fuscous, darker terminally.

I. of Wight, probably a scarce immigrant only; SC. and S. Europe, WC. Asia to Turkestan, N. America; 6-8.

14. Euzophera, *Z.*

Face smooth. Antennae in ♂ shortly ciliated. Labial palpi moderate, curved, ascending, with appressed scales, terminal joint moderate, pointed. Maxillary palpi short, filiform. Forewings: 4 and 5 stalked. Hindwings: cell reaching ½, 3 and 4 short-stalked, 5 absent, 7 anastomosing with 8 to beyond middle.

Not very numerous in species, as now restricted, and mainly characteristic of the Northern hemisphere. Imago with forewings elongate, rather dilated, costa slightly arched.

First line preceded by broad blackish band . 1. *pinguis.*
„ not preceded by blackish band . 2. *cinerosella.*

1. **E. pinguis,** *Hw.* (*pinguedinella,* Dbld.) 23-25 mm. Forewings light brownish-ochreous, somewhat reddish-tinged, pale-sprinkled, with a few blackish scales; lines hardly paler, first rather curved, edged anteriorly by a broad blackish band, posteriorly by a thick blackish suffusion, second angulated in middle, strongly edged with dark fuscous; terminal area more infuscated. Hindwings light fuscous.

England to York, local; Germany; 7, 8. Larva pinkish-ochreous; dorsal line darker, interrupted; a lateral spot on 3 and 12 ringed with reddish-brown; head and plate of 2 reddish-brown, blackish-marked: in bark of ash; 9-6, perhaps sometimes living two years.

2. **E. cinerosella,** *Z.* (*artemisiella,* Stt.) 17-23 mm. Forewings brownish-ochreous, more or less mixed with dark fuscous, costal half and termen suffused with whitish; lines pale or partly whitish, first angulated, more or less dark-edged posteriorly, second twice indented, traversed by an oblique dark fuscous shade from costa before apex to middle of disc; two dark fuscous transversely placed discal dots; a terminal series of dark dots. Hindwings light fuscous.

S. England to Pembroke and Norfolk, on coasts, local; C. Europe; 7, 8. Larva greyish-ochreous-whitish; dorsal line darker; a darker lateral ring on 3 and 12; head and plate of 2 reddish-brown: in roots of *Artemisia absinthium;* 10-5.

15. CATEREMNA, *Meyr.*

Face smooth. Antennae in ♂ shortly ciliated. Labial palpi moderately long, curved, ascending, with appressed scales, terminal joint moderate, pointed. Maxillary palpi moderate, filiform. Forewings: 4 and 5 approximated. Hindwings: cell reaching ½, 3 and 4 short-stalked, 5 absent, 7 closely approximated to 8 to middle.

A small genus, but very widely distributed; derived from

Myelois. Imago with forewings elongate-triangular, costa gently arched.

1. **C. terebrella,** *Zk.* 20-23 mm. Forewings rather dark fuscous; lines white, first nearly straight, oblique, second slender, twice indented; a suffused whitish fascia near before second line, broader and more distinct towards costa, including two dark transversely placed discal dots; termen whitish-irrorated. Hindwings fuscous.

Norfolk, local; C. Europe; 7, 8. Larva whitish; dorsal line dark grey; dots black; head and plate of 2 light reddish-brown: in distorted and stunted cones of *Pinus abies;* 9-6, probably sometimes living two years.

16. HOMOEOSOMA, *Curt.*

Face with short scale-projection. Antennae in ♂ shortly ciliated, with a notch above basal joint. Labial palpi moderately long, arched, ascending, with tolerably appressed scales, terminal joint rather short, tolerably pointed. Maxillary palpi moderate, loosely scaled. Forewings: 4 and 5 stalked, 9 absent. Hindwings: cell not nearly reaching $\frac{1}{2}$, 3 and 4 approximated or connate, 5 absent, 7 anastomosing with 8 to near apex.

Not numerous in species, but of cosmopolitan occurrence. Imago with forewings narrow, costa hardly arched. Larva usually feeding in heads of *Compositae;* possibly the ready distribution of the seeds of these plants by the wind may account for the wide range of the genus, since the eggs might be transported with the seeds.

1. First line nearly entire . . . 1. *sinuella.*
,, reduced to two or three dots . . 2.
2. Median dot of first line before subdorsal 2. *binaevella.*
,, ,, ,, beyond subdorsal . 3.
3. Second line marked by about five blackish dots 3. *cretacella.*
,, ,, not so marked . . . 4.
4. First line marked by two dots; expanse 22 mm. or more . . 5. *nebulella.*
,, ,, ,, three dots; expanse 19 mm. or less . . 4. *nimbella.*

1. **H. sinuella,** *F.* 17-21 mm. Forewings pale yellowish-ochreous, sometimes faintly reddish-tinged; lines deeper ochreous to dark fuscous, ill-defined, first slightly curved, second straight, dilated on costa; a suffused darker or fuscous terminal streak. Hindwings fuscous.

S. England to Pembroke and Norfolk, E. Ireland, on coasts, local; SC. and S. Europe, WC. Asia to Turkestan; 7. Larva whitish; head light reddish-brown; plate of 2 pale brown, posterior edge black-dotted: in root-stocks of *Plantago lanceolata;* 8-4.

2. **H. binaevella,** *Hb.* (*eluviella,* Dbld.) 20-25 mm. Forewings distinctly dilated, pale brownish-ochreous, costal half suffused with white, with a few dark fuscous scales; first line indicated by a straight oblique series of three large dark fuscous dots; second pale, obscurely dark-edged; two large dark fuscous transversely placed discal dots. Hindwings light fuscous.

England to Lancashire, E. Ireland, local; C. and S. Europe; 7. Larva pale green; dorsal and subdorsal lines pink; spiracular pink, interrupted; head reddish-brown; plate of 2 posteriorly brownish: in flower-heads of *Carduus lanceolatus;* 8, 9.

3. **H. cretacella,** *Rsl.* (*senecionis,* Vaughan) 19-21 mm. Forewings distinctly dilated, pale brownish-ochreous, becoming whitish towards costa, sprinkled with dark fuscous; first line indicated by an angulated oblique series of three blackish dots, second by a straight series of about five dark fuscous dots; two blackish transversely placed discal dots. Hindwings pale fuscous.

S. England to Gloucester and Norfolk, N. Ireland, on coasts, local; C. Europe; 5, 7. Larva deep purple-brown; head and plate of 2 blackish-brown: in flower heads and stems of *Senecio jacobaea;* 6, 8, 9.

4. **H. nimbella,** *Z.* (*saxicola,* Vaughan) 13-19 mm. Forewings light ochreous, sometimes greyish-tinged, more or less sprinkled with dark fuscous, towards costa more or less broadly suffused with white; first line indicated by an angulated oblique series of three blackish dots, second straight, almost obsolete, hardly dark-edged; two blackish transversely placed discal dots. Hindwings pale fuscous.

Britain to Kirkcudbright, E. Ireland, on coasts, local; Europe, WC. Asia to N. Persia; 6, 8. Larva yellowish-green; dorsal line, subdorsal series of spots or rings, and spiracular series of three marks on each segment purplish; head dark brown; plate of 2 yellow-brown, posterior edge black: in flowers of *Anthemis, Jasione, Senecio,* etc.; 7, 9.

5. **H. nebulella,** *Hb.* 22-25 mm. Forewings pale whitish-ochreous, tinged with grey and sprinkled with dark grey, towards costa suffused with whitish; first line indicated by two blackish dots, upper more remote from base; second

faintly darker-edged, usually preceded by a dark fuscous subdorsal dot; two blackish transversely placed discal dots. Hindwings subhyaline, fuscous-tinged, veins and termen fuscous.

England to York, E. Ireland, rather common; C. Europe, WC. Asia to N. Persia; 7, 8. Larva dull greenish-yellow; dorsal and broader subdorsal lines dull purple; spiracular interrupted, double, dull purple; head brown: in flower-heads of *Carduus;* 8, 9.

17. NYCTEGRETIS, *Z.*

Face smooth. Antennae in ♂ minutely ciliated. Labial palpi moderately long, curved, ascending, thickened with tolerably appressed scales, terminal joint somewhat longer than second, tolerably pointed. Maxillary palpi moderate, filiform. Forewings: 4 and 5 stalked. Hindwings: cell not reaching ½, 3 and 4 connate or stalked, 5 out of 4 or usually absent, 7 anastomosing with 8 to middle.

A small genus, mainly inhabiting S. Europe. Imago with forewings narrow, costa slightly arched.

1. **N. achatinella**, *Hb.* 16-17 mm. Forewings brown, sometimes reddish-tinged, somewhat sprinkled with darker and whitish; lines straight, white, anteriorly darker-edged, first very oblique; a white anteriorly dark-edged discal spot. Hindwings light fuscous.

Kent to Norfolk, local; C. Europe, WC. Asia to N. Persia; 7. Larva in a dense silken gallery amongst flower-stems of *Sedum sexangulare;* 5, 6.

18. MYELOIS, *Hb.*

Face smooth. Antennae in ♂ shortly or moderately ciliated. Labial palpi rather long, curved, ascending, with loosely appressed scales, terminal joint moderate, pointed. Maxillary palpi short, loosely scaled. Forewings: 4 and 5 stalked, 10 sometimes out of 9 or absent. Hindwings: cell reaching ½, 3 sometimes out of 5, 4 and 5 stalked, 7 anastomosing with 8 to middle.

The rather numerous species inhabit Europe, Central Asia, N. and S. America. Imago with forewings elongate-triangular, costa little arched.

1. Forewings white . . . 2. *cribrella.*
   ,, not white . . . . 2.
2. Head and thorax orange . . . 1. *cirrigerella.*
   ,, ,, grey . . . 3. *ceratoniae.*

1. **M. cirrigerella,** *Zk.* 18-20 mm. Head and thorax ochreous-orange. Forewings rather short, dilated, glossy light brownish-ochreous, base orange-tinged ; 10 absent. Hindwings light fuscous.

Wilts (Ramsbury), several specimens in 1874 ; C. Europe ; 7, 8.

2. **M. cribrella,** *Hb.* 25-30 mm. Forewings glossy white ; a subbasal black dot, two representing first line, one in disc beyond these, two transversely placed in disc beyond middle, and a series of about six representing second line ; some smaller terminal black dots ; 10 sometimes out of 9. Hindwings grey-whitish, more or less suffused with dark grey towards costa and termen.

S. England to Hereford and Norfolk, local ; C. and S. Europe, N. and WC. Asia, Japan ; 7, 8. Larva pale greyish-ochreous, greenish-tinged ; dorsal line darker, pale-edged ; lateral pale ; head and plate of 2 black : in flower-heads of *Carduus*, *Onopordon*, etc., subsequently entering the stems ; 8-4.

3. **M. ceratoniae,** *Z.* (*pryerella*, Vaughan) 18-26 mm. Forewings narrow, rather dark grey, irrorated with whitish, veins obscurely darker-streaked ; lines paler, internally dark-edged, first more strongly, oblique, indented near dorsum, second serrulate ; two indistinct darker transversely placed discal dots ; darker terminal dots. Hindwings subhyaline, grey-whitish, greyer posteriorly, veins and termen grey.

Kent, Middlesex, scarce and local ; SC. and S. Europe, Africa, W. Indies, range partially due to artificial introduction ; 8, 9. Larva rosy-pink or pinkish-ochreous ; head reddish-brown ; plate of 2 reddish-brown, posterior edge black : in seeds of *Robinia*, *Ceratonia*-beans, dried dates, etc. ; 5-7.

19. EURHODOPE, *Hb.*

Face smooth. Antennae in ♂ shortly ciliated. Labial palpi moderately long, curved, ascending, loosely scaled, terminal joint moderate, pointed. Maxillary palpi short, tolerably filiform. Forewings : 4 and 5 approximated. Hindwings : cell reaching ½, 4 and 5 closely approximated or stalked, 7 anastomosing with 8 to middle.

A genus of moderate size, ranging throughout the Northern hemisphere and Africa. Imago with forewings elongate-triangular, costa little arched.

1. Discal dots obliquely placed . . 2. *advenella*.
„ „ transversely placed . . . 2.
2. First line whitest towards costa . . 3. *suavella*.
„ „ „ towards dorsum . 1. *marmorea*

1. **E. marmorea,** *Hw.* (*epelydella,* Z.) 17-21 mm. Thorax brown-reddish. Forewings rather dark fuscous, slightly reddish-tinged; basal area brown-reddish except on costa; lines slender, obscurely whitish, first somewhat bent, more distinct dorsally, second posteriorly edged with brown-reddish; a fascia of white irroration from costa before second line to lower extremity of first, including two darker connected discal dots; some whitish irroration towards termen. Hindwings fuscous.

England to Westmoreland, local; C. Europe, Asia Minor; 6, 7. Larva dark reddish-brown; a pale lateral black-centred spot on 3 and 12; head and plate of 2 reddish-brown, black-marked: amongst spun leaves of blackthorn; 5.

2. **E. advenella,** *Zk.* 18-22 mm. Head and front of thorax ferruginous-reddish. Forewings brownish-ochreous, more or less mixed or suffused with reddish and dark fuscous; lines slender, obscurely whitish, first bent, preceded by a straight whitish line joining it near costa, space between them reddish suffused anteriorly with dark fuscous, second darker-edged; a broad fascia of grey-whitish irroration from costa before second line to lower extremity of first, including two obliquely placed darker discal dots; some whitish irroration towards termen. Hindwings fuscous.

Britain to Kirkcudbright, local; C. Europe; 7. Larva light green; subdorsal line purplish-pink; head pale brown: in a silken gallery amongst flowers and leaves of hawthorn and *Pyrus;* 5, 6.

3. **E. suavella,** *Zk.* 21-23 mm. Forewings fuscous, becoming darker towards costa, slightly purplish-tinged, base more reddish; lines slender, whitish, first slightly curved, whiter towards costa, preceded by a fascia of white irroration including a transverse brown-reddish dorsal spot; a large triangular costal blotch of whitish irroration before second line, enclosing two dark fuscous transversely placed discal dots; some whitish irroration towards termen. Hindwings fuscous.

S. England to Hereford and Norfolk, local; WC. and S. Europe; 7. Larva dark reddish-brown; a brownish-grey black-centred lateral spot on 3 and 12; head dark brown; plate on 2 black: in a silken gallery amongst leaves of blackthorn and hawthorn; 5, 6.

20. CRYPTOBLABES, *Z.*

Face smooth. Antennae in ♂ minutely ciliated, with slight sinuation near base, suprabasal joint rather long, with a sharp horny apical hook. Labial palpi rather long, curved, ascending, with appressed scales, terminal joint moderately long, pointed. Maxillary palpi short, loosely scaled. Forewings: 4 and 5 approximated. Hindwings: cell hardly reaching ½, 4 and 5 approximated, 7 anastomosing with 8 to middle.

Includes only the single species. Imago with forewings narrow, costa slightly arched.

1. **C. bistriga**, *Hw.* 17-19 mm. Forewings fuscous, veins broadly suffused with fuscous-reddish; lines whitish, first at ⅓, rather thick, straight, second very near termen, serrate; discal dots obscurely indicated; a whitish terminal suffusion. Hindwings light fuscous.

England to Westmoreland, common; C. Europe; 6, 7. Larva pale brown, darker-freckled; dorsal line darker; subdorsal and lateral blackish-brown; spiracular ochreous-whitish, double; a brown black-centred lateral spot on 3 and 12; head light brown: in folded leaves of oak and alder; 9, 10.

21. ACROBASIS, *Z.*

Face smooth. Antennae in ♂ shortly ciliated, sometimes with slight sinuation near base, basal joint with a horny scaled apical tooth. Labial palpi moderately long, curved, ascending, loosely scaled, terminal joint moderate, pointed. Maxillary palpi short, tolerably filiform. Forewings: 4 and 5 approximated. Hindwings: cell reaching ½, 4 and 5 approximated, 7 closely approximated to 8 to middle.

A rather considerable genus, widely distributed throughout the Northern hemisphere, and also found in Africa. Imago with forewings elongate-triangular, costa slightly arched.

1. Forewings with antemedian scale-ridge towards dorsum . . 4. *tumidana.*
,, without scale-ridge . . . 2.
2. Basal area reddish-ochreous . . 3. *Zelleri.*
,, ,, brown-reddish, mixed with paler . 3.
3. Forewings mixed or suffused with dark fuscous . . . 1. *consociella.*
,, not mixed with dark fuscous . 2. *sodalella.*

1. **A. consociella**, *Hb.* 18-20 mm. Differs from *A. sodalella* only as follows: forewings mixed or sometimes much suffused with dark fuscous, basal area distinctly paler, more mixed with ochreous-whitish, first line less distinct, browner.

Britain to the Clyde, S. Ireland, common; C. Europe; 7, 8. Larva pale grey, tinged with yellowish or greenish; dorsal, subdorsal, and lateral lines dark grey; a whitish black-ringed lateral spot on 3; head and plate of 2 yellow-brownish, darker-dotted: in a silken gallery amongst spun leaves of oak; 5, 6.

2. **A. sodalella,** *Z.* 20-24 mm. Forewings brown-reddish, somewhat whitish-sprinkled; first line greyish-ochreous on lower ⅔, thick, towards costa confluent with a straight white transverse shade preceding it, included narrow space blackish-mixed; a broad fascia of white irroration from costa before second line to lower extremity of first, including two blackish transversely placed discal dots; second line whitish; a terminal fascia of whitish irroration. Hindwings light fuscous, darker terminally.

Pembroke, perhaps overlooked elsewhere, local; C. and SE. Europe; 7, 8. Larva greenish-white; dorsal, subdorsal, and lateral lines blackish; white black-centred lateral spots on 3 and 12; head and plate of 2 yellow-brownish, black-marked: amongst spun leaves of oak; 5, 6.

3. **A. Zelleri,** *Rag.* (*tumidella,* Zk.) 19-23 mm. Forewings fuscous, tinged with red and sprinkled with ochreous-whitish; basal area reddish-ochreous, limited by a straight white line separated by a dark fuscous shade from obscure reddish-ochreous costally obsolete first line; a broad obscure fascia of ochreous-whitish irroration from costa before second line to lower extremity of first, including two darker obliquely placed discal dots; second line obscurely whitish, edged anteriorly with darker, posteriorly with reddish; an ochreous-whitish terminal irroration. Hindwings fuscous.

England to York, common; C. Europe; 7, 8. Larva greenish-yellow; several indistinct whitish lines above; head darker: amongst spun leaves of oak; 5, 6.

4. **A. tumidana,** *Schiff.* (*rubrotibiella,* F.R.) 18-22 mm. Forewings fuscous mixed with red-brownish, somewhat sprinkled with grey-whitish; basal area paler, on base and costa brown-reddish, limited by a white line bent beneath costa, followed by a thick transverse ridge of raised reddish-tinged scales, anteriorly mixed with dark fuscous, not reaching costa, preceding the obsoletely lighter first line; a broad obscure fascia of grey-whitish irroration near before obscurely whitish second line, including two darker obliquely placed discal dots; a grey-whitish terminal irroration. Hindwings fuscous.

Kent, Suffolk, local; C. and S. Europe; 7, 8. Larva yellowish-green to blackish-brown; dorsal and broad lateral lines brown; a whitish lateral spot on 3, edged by a black crescent;

head greenish, sometimes brown-spotted: amongst spun leaves of oak; 9-6.

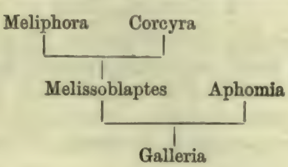
2. GALLERIADAE.

Ocelli present. Tongue usually short. Antennae in ♂ naked or minutely ciliated, basal joint with scale-tooth. Maxillary palpi present, not triangular, loosely scaled. Forewings: 1b usually furcate, 4 and 5 closely approximated or stalked or coincident, 8 and 9 out of 7. Hindwings with defined pecten of hairs on lower margin of cell, 4 and 5 closely approximated or stalked or coincident, 7 out of 6 near origin, anastomosing with 8.

Only a small family, but representatives of it are found almost everywhere except in New Zealand, though they are nowhere prominent. Imago with forewings more or less elongate or suboblong, palpi differing sexually. Species nocturnal in habit.

Larva rather elongate, with few hairs; feeding on dry vegetable substance. Pupa in a dense firm cocoon above ground.

PHYLOGENY OF GALLERIADAE.



TABULATION OF GENERA.

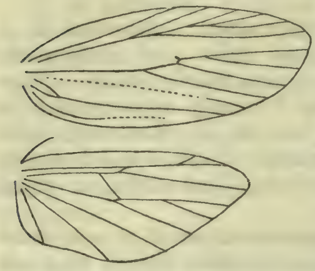
1. Hindwings with 3 and 4 separate .	5. GALLERIA.
„ „ stalked . .	2.
2. Forewings with 10 absent .	1. MELIPHORA.
„ 10 present . . .	3.
3. Forewings in ♂ with cell greatly enlarged, open . .	4. APHOMIA.
„ „ cell normal . .	4.
4. Forewings with 5 absent . . .	2. CORCYRA.
„ 5 present .	3. MELISSOBLAPTES.

1. MELIPHORA, *Gn.*

Face nearly smooth. Labial palpi very short, in ♂ ascending, in ♀ porrected. Forewings: 4 and 5 stalked, 10 absent.

Hindwings in ♂ with long dorsal hair-pencil; 3 and 4 stalked, 5 absent, 7 anastomosing with 8 to beyond middle.

Contains only one species, whose native country is now uncertain, but probably European. Imago with forewings elongate-oval; in repose the antennae are sometimes waved in rapid alternate revolutions. The generic name *Achroia*, Hb., is preoccupied by Hübner himself for a genus of *Papilionina*.



Neuration of *Meliphora grisella*.

1. **M. grisella**, *F.* (*alvearia*, F.) 15-22 mm. Head ochreous-yellow. Forewings pale shining fuscous. Hindwings whitish-fuscous.

England to York, Ireland, common; Europe, WC. Asia, N. America, Australia, artificially spread; 7, 8. Larva grey-whitish; dorsal line dark purplish; head and plate of 2 dark brown: on wax in beehives and dried apples; 9-5. Often very destructive in old hives.

2. CORCYRA, *Rag.*

Face with projecting tuft of scales. Tongue rudimentary. Labial palpi in ♂ short, ascending, second joint densely scaled, terminal slender, naked, with apical hook, in ♀ rather long, porrected, with appressed scales. Forewings: 5 absent. Hindwings: 3 and 4 long-stalked, 5 absent, 7 anastomosing with 8 to middle.

Also restricted to a single species of doubtful nativity. Imago with forewings elongate-oval.

1. **C. cephalonica**, *Stt.* 14-20 mm. Head ochreous-whitish. Forewings greyish-ochreous or light fuscous, along dorsum paler or whitish-sprinkled; veins more or less streaked suffusedly with dark fuscous, disc anteriorly sometimes wholly suffused with dark fuscous. Hindwings whitish-fuscous to fuscous.

Kent, Middlesex, York, local; S. Europe (?); 7, 9, 10. Larva on dried currants; 8, 11-5.

3. MELISSOBLAPTES, *Z.*

Face with strong projecting ridge of scales. Labial palpi in ♂ moderate, ascending, second joint densely scaled, terminal internally naked, slender, with apical hook, in ♀ long, porrected, with dense loosely appressed scales. Forewings in ♂ with swelling at base of costa, 4 and 5 connate or stalked. Hindwings: 3 and 4 stalked, 5 absent, 7 anastomosing with 8 to middle.

Although containing but few species, the genus is almost cosmopolitan, being only absent from New Zealand. Imago with forewings narrow-oblong, costa moderately arched, termen obliquely rounded.

1. **M. bipunctanus**, *Z.* 22-33 mm. Forewings in ♂ whitish-ochreous, sometimes ferruginous-tinged towards costa, sometimes mixed with fuscous and whitish dorsally, in ♀ brownish-ochreous or fuscous sprinkled with dark fuscous and whitish; dark fuscous discal dots before and beyond middle, placed in a pale longitudinal streak, posterior sometimes pale-centred; second line angulated, formed of more or less distinct dark fuscous streaks on veins. Hindwings fuscous-whitish, becoming pale fuscous posteriorly.

Kent, Norfolk, on coasts, local; C. and S. Europe, WC. Asia to Turkestan, N. Africa; 7, 8. Larva in nests of wasps, heads of *Inula*, and probably on roots, but habits hardly understood; 6, 7.

[*M. anellus*, Schiff., a very similar South European species, with much broader forewings, and 5 of hindwings present, has been accounted British, but probably only through confusion with *M. bipunctanus*.]

4. Aphomia, *Hb.*

Face with strong projecting ridge of scales. Labial palpi in ♂ moderate, ascending, second joint with dense rather rough scales, terminal rather short, naked, in ♀ very long, porrected, with appressed scales. Forewings in ♂ with swelling at base of costa, cell in ♂ very large, open posteriorly, in ♀ normal, 4 and 5 in ♂ absent, in ♀ approximated or connate. Hindwings: 3 and 4 stalked, 5 absent, 7 anastomosing shortly with 8.

Probably rightly restricted to the single species. Imago with forewings elongate, costa moderately arched, termen obliquely rounded.

1. **A. sociella**, *L.* (*colonella*, L.) 23-35 mm. Forewings brown-reddish, sprinkled with black, in ♂ much suffused with whitish, especially on basal area, more or less olive-greenish towards costa posteriorly and termen, in ♀ with basal, costal, and terminal areas suffused with olive-green; first and second

lines darker, dentate; black discal elongate dots before and beyond middle, in ♂ very near costa, second in ♀ round, larger. Hindwings pale fuscous, towards apex darker.

Britain to Ross, Ireland, common; Europe, N. America; 6-8. Larva ochreous-grey-whitish; head and plate of 2 brown: in silken galleries on fibrous material of nests of wasps, and under decayed bark; 8-10.

5. GALLERIA, *F.*

Face with strong projecting ridge of scales. Labial palpi in ♂ moderate, subascending, terminal joint curved inwards, naked, flattened, pointed, in ♀ moderately long, porrected, with appressed scales. Forewings: cell in ♂ enlarged, open, 4 and 5 approximated. Hindwings: 4 and 5 stalked, sometimes coincident, 7 anastomosing shortly with 8.

Also includes one species only. Imago with forewings suboblong, costa in ♂ strongly, in ♀ moderately arched, termen with a triangular submedian projection, stronger in ♂.

1. **G. mellonella**, *L.* (*cereana*, L.) 28-38 mm. Forewings brown, suffusedly irrorated with ashy-whitish, especially on costal half towards base, and sprinkled with black, dorsal area much mixed with whitish-ochreous or ferruginous; some tufts of raised scales on fold; first and second lines angulated, faint, towards dorsum marked with short blackish dashes on veins and small dorsal spots, first sometimes almost obsolete. Hindwings in ♂ pale fuscous, becoming dark posteriorly, in ♀ fuscous-whitish, terminally fuscous.

England to York, Ireland, local; Europe, WC. Asia to N. Persia, N. America, Africa, Australia, spread by artificial means; 7-10. Larva pale dull grey; head and plate of 2 dark reddish-brown: in old honeycombs in beehives; 5-8.

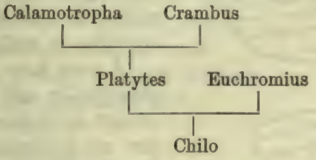
3. CRAMBIDAE.

Ocelli usually developed. Labial palpi very long, straight, porrected, loosely rough-scaled, attenuated forwards. Maxillary palpi well developed, strongly triangular. Forewings: 1b simple or obsoletely furcate, 4 and 5 closely approximated or stalked, 7 separate or out of 8, 8 and 9 rarely coincident. Hindwings with defined pecten of hairs on lower margin of cell, 4 and 5 connate or stalked or coincident, 7 out of 6 near origin or approximated only, anastomosing with 8.

A considerable family, more especially characteristic of temperate regions. Imago with forewings elongate, often very narrow; the palpi are remarkably uniform in structure. The natural flight of these insects is usually towards sunset, but most of them are very readily disturbed by day.

Ovum oval, ribbed and reticulated, or smooth. Larva elongate, with few hairs; usually feeding in silken galleries on grasses or moss. Pupa in a cocoon within the larval galleries.

Phylogeny of Crambidae.



Tabulation of Genera.

1. Forewings with 7 out of 8 . . . 2.
,, ,, 7 separate . . . 3.
2. Ocelli concealed . . . 1. Calamotropha.
,, exposed, distinct . . . 2. Crambus.
3. Forewings in ♂ with semitransparent patch in cell . . . 4. Euchromius.
,, ,, without such patch . . 4.
4. Face with conical horny projection . 5. Chilo.
,, without projection . . . 3. Platytes.

1. Calamotropha, *Z.*

Face with short prominence. Ocelli present, concealed with scales. Antennae in ♂ ciliated. Forewings: 7 out of 8. Hindwings: 4 and 5 connate, 7 out of 6.

A small widely scattered genus, closely related to *Crambus*. Imago with forewings oblong-triangular, termen hardly oblique. Larva said to mine in leaves; the observation is an ancient one, and has not been confirmed.

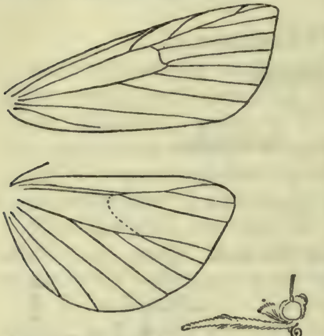
1. **C. paludella**, *Hb.* 21-36 mm. Forewings whitish-fuscous or light brownish, sometimes partially suffused with whitish; a basal blackish dot, another near it, two or three representing first line, one in disc beyond middle, and a series representing second line, all sometimes very obscure or almost obsolete. Hindwings white.

Devon, Suffolk, Norfolk, in marshes, local; C. Europe, WC.

Asia to N. Persia; 7, 8. Larva whitish; spots grey; head brown: in leaves of *Typha latifolia;* 5, 6.

2. Crambus, *F.*

Face rounded, or with conical horny projection. Antennae in ♂ ciliated or dentate. Forewings: 4 and 5 sometimes stalked, 7 out of 8, 8 and 9 sometimes coincident, 10 rarely out of 8, 11 rarely connected with 12. Hindwings: 4 and 5 connate or stalked, 7 out of 6.



Neuration and head of *Crambus culmellus.*

A very large genus, occurring plentifully all over the world except in Australia, where there are no indigenous species, and the Indo-Malayan region, where there are comparatively few. The different types of frontal and antennal structure are completely connected by transitional forms; the differences of neuration occur in different specimens of the same species. The larvae probably all feed amongst stems and roots of grass or on moss, but are proportionately less known than those of any other considerable genus.

1. Forewings with ground-colour whitish . . 2.
,, ,, ,, ochreous, brown, or grey . . 3.
2. Second line distinct . . . 12. *falsellus.*
,, ,, absent . . . 19. *perlellus.*
3. Forewings with strong white median streak to ¾ or beyond . . . 4.
,, without such streak, median vein sometimes whitish . . . 16.
4. Cilia of forewings metallic . . . 5.
,, ,, sometimes shining, not metallic 11.
5. Median streak cut by median line . . 6.
,, ,, not cut by median line . 1. *hamellus.*
6. Median streak reaching costa towards base . 7.
,, ,, not reaching costa . . 8.
7. Hindwings whitish . . 2. *uliginosellus.*
,, grey . . . . 3. *pascuellus.*

8. Forewings with white subcostal streak . . . 9.
,, without such streak . . . 10.
9. Upper edge of median streak straight . 7. *pratellus.*
,, ,, ,, angulated beyond middle 6. *dumetellus.*
10. Median streak continued to termen . 5. *silvellus.*
,, ,, not reaching termen . 4. *ericellus.*
11. Median streak interrupted . . . 12.
,, ,, entire . . . . 13.
12. Median streak twice interrupted . . 14. *myellus.*
,, ,, once interrupted . . 15. *pinellus.*
13. Median streak reaching termen . . 18. *latistrius.*
,, ,, not reaching termen . . 14.
14. Forewings ferruginous-brown . . . 15.
,, ochreous . . . 26. *selasellus.*
15. Hindwings light grey . . 16. *margaritellus.*
,, dark grey . . . 17. *furcatellus.*
16. Cilia of forewings strongly metallic . . 17.
,, ,, not or slightly metallic . 21.
17. Median line present . . . . 18.
,, ,, absent . . . . 20.
18. Lines acutely angulated . . . 22. *geniculeus.*
,, not acutely angulated . . . 19.
19. Forewings irrorated with black . 11. *chrysonuchellus.*
,, not irrorated with black . 10. *craterellus.*
20. Second line present . . . 9. *hortuellus.*
,, ,, absent . . . 8. *culmellus.*
21. Face with well-marked cone . . . 22.
,, without cone . . . . 23.
22. Median line present . . 21. *inquinatellus.*
,, ,, absent . . . 25. *tristellus.*
23. Second line white . . . 13. *verellus.*
,, ,, ochreous or dark fuscous . . 24.
24. Cilia of forewings regularly barred 20. *fascelinellus.*
,, ,, not regularly barred . . 25.
25. Forewings with blackish submedian streak from base . . . 24. *salinellus.*
,, without such streak . 23. *contaminellus.*

1. **C. hamellus**, *Thnb.* 22-23 mm. Forewings with apex slightly produced; brown, posteriorly whitish-sprinkled, terminally suffused with white; a broad snow-white pointed median longitudinal streak from base, not reaching second line, lower edge with a projection in middle; second line

angulated, silvery-white, anteriorly dark-edged; a triangular white subapical spot; several terminal longitudinal black marks; cilia metallic. Hindwings grey.

England to Lancashire, S. Ireland, local; N. and C. Europe, N. Asia, N. America; 7.

2. **C. uliginosellus,** *Z.* 17-21 mm. Forewings with apex slightly produced; yellow-ochreous, posteriorly with whitish interneural streaks edged with dark fuscous; a suffused white dorsal streak; a broad white median longitudinal streak, edged with dark fuscous, reaching costa until near middle, cut by an oblique dark brown line beyond middle, and usually by an ochreous subcostal line; second line angulated, silvery-white, preceded and followed by triangular white costal spots; some black terminal dots; cilia metallic. Hindwings whitish, towards apex suffused with grey.

S. England to Hereford and Norfolk, local; Holland, Germany, N. Italy; 6, 7.

3. **C. pascuellus,** *L.* 21-24 mm. Forewings with apex triangularly produced; brownish-ochreous, posteriorly with whitish blackish-edged interneural streaks; a white dorsal streak; a broad shining white median longitudinal streak, reaching costa towards base, narrowed posteriorly, where it is cut by an oblique dark line, not passing second line; second line angulated, silvery-white, dark-edged anteriorly, preceded by a white costal spot and followed by a V-shaped mark; some black terminal longitudinal marks; cilia metallic. Hindwings grey, more whitish dorsally.

Britain to the Shetlands, Ireland, common; N. and C. Europe, Asia Minor, N. Asia; 6, 7.

4. **C. ericellus,** *Hb.* 19-25 mm. Forewings with apex hardly produced; golden-ochreous; a narrow white dorsal streak; a rather narrow shining white median longitudinal streak from base to $\frac{7}{8}$, obliquely cut at $\frac{3}{4}$ of length, apex truncate; grey dark-edged interneural streaks in disc posteriorly; second line shining white, bent, preceded by a white oblique costal mark; a small white triangular subapical spot; five black dots on lower part of termen, sometimes surrounded by whitish suffusion; cilia metallic. Hindwings grey.

Cumberland, Perth to the Orkneys, on moors, local; N. and C. Europe; 7.

5. **C. silvellus,** *Hb.* (*adippellus,* Tr.) 20-24 mm. Differs from *C. pascuellus* as follows: forewings with apex little produced, dorsum less whitish, median streak less broad, continued

beyond second line to termen, costal spot before second line much more elongate.

Surrey to Dorset and Norfolk, S. Ireland, local; N. and C. Europe; 6-8.

6. **C. dumetellus**, *Hb.* 20-23 mm. Differs from *C. pratellus* as follows: forewings with interneural streaks whiter, upper edge of median streak angulated beyond middle, terminal white streak reduced to an apical spot.

Britain to Caledonian Canal, local; N. and C. Europe, N. America; 6, 7.

7. **C. pratellus**, *L.* 18-20 mm. Forewings with apex somewhat produced; brown, sometimes ochreous-mixed, in ♂ with grey, in ♀ with whitish blackish-edged interneural streaks; a subcostal white streak on basal half; a white median streak, upper edge straight, lower edge projecting in middle, cut by sharply angulated dark brown median line; second line angulated, white, edged with dark brown, preceded by white costal mark; a white terminal streak, with several black dots; cilia metallic. Hindwings rather dark grey.

Britain to the Shetlands, Ireland, very common; N., C., and SW. Europe, Asia Minor; 5-8. Larva greenish-grey or brownish-grey; dots darker; head brown, darker-marked: in silken galleries above or among roots of grasses; 7-4.

8. **C. culmellus**, *L.* 17-19 mm. Forewings brown; a whitish median streak, ending in branches along veins 2-5, often separated by dark fuscous scales; dorsal ⅔ often wholly suffused with whitish-ochreous; a terminal series of black dots; cilia metallic. Hindwings rather dark grey.

Britain to the Shetlands, Ireland, abundant; N. and C. Europe, N. Asia; 6-8. Larva pale pinkish-ochreous; spots brown; head and plate of 2 brown, darker-marked: in silken galleries amongst stems of grasses (*Festuca*, etc.); 9-6.

9. **C. hortuellus**, *Hb.* 18-22 mm. Forewings brown; veins except towards costa marked with whitish-ochreous streaks, sometimes broadly suffused and yellowish-tinged; leaden-grey dark-edged interneural streaks; angulated second line and a short streak from costa near apex leaden-grey; three black dots on lower half of termen; cilia metallic. Hindwings grey.

Britain to the Shetlands, Ireland, very common; N. and C. Europe, WC. and N. Asia, N. America; 6, 7. Larva dull purplish-brown; spots darker or black; head and plate of 2 pale yellowish-brown to dark brown: amongst stem-bases of grasses; 9-4.

10. **C. craterellus**, *Sc.* (*rorellus*, L.; *cassentiniellus*, Z.) 19-22 mm. Palpi extremely long. Forewings dark brown mixed with leaden-grey; veins and costal edge marked with strong ochreous-whitish partly yellow-tinged streaks; median and second lines curved, dark brown; three or four blackish dots on lower half of termen; cilia metallic. Hindwings grey.

Kent to Devon, scarce; C. and S. Europe, WC. Asia to Turkestan; 6.

11. **C. chrysonuchellus**, *Sc.* 20-23 mm. Forewings ferruginous-brown, clearly irrorated with black; veins and costal edge marked with rather undefined white streaks; median line thick, obtusely angulated, ferruginous-brown; second white, anteriorly edged with ferruginous-brown, rounded-angulated; termen ferruginous-yellow, with some indistinct black dots; cilia metallic. Hindwings grey.

S. England to Worcester and Norfolk, local; C. Europe, Asia Minor, NW. Asia; 5, 6.

12. **C. falsellus**, *Schiff.* 18-20 mm. Forewings whitish, irregularly tinged with brown, confusedly irrorated with black in disc between veins; a rather broad shining white median streak from base to $\frac{3}{5}$, lower edge angularly projecting in middle; second line white, anteriorly dark-edged, strongly curved, sharply indented near dorsum, preceded except dorsally by a shining white fascia twice or thrice interrupted above middle; a white apical spot; three black dots on lower half of termen, preceded by a white spot; cilia submetallic, irregularly barred. Hindwings pale grey.

Britain to Aberdeen, rather local; N. and C. Europe; 7, 8. Larva grey; spots black; head brown: amongst moss, growing on old walls; 2-5.

13. **C. verellus**, *Zk.* 18-20 mm. Forewings brown, suffusedly mixed with blackish except on veins and towards costa; anterior half of costa white; an undefined white median streak from base, becoming soon obsolete; second line white, strongly curved and interrupted above middle, indented near dorsum, indentation preceded by an oblique white wedge; cilia rather metallic grey, with three or four slender white bars. Hindwings light grey.

Kent, Cambridge, scarce and local; C. Europe; 7, 8. Larva amongst moss on tree-trunks; 3-5.

14. **C. myellus**, *Hb.* 19-21 mm. Face slightly prominent. Forewings ferruginous-ochreous, brown-tinged towards costa posteriorly; a shining white gradually broadly dilating median

streak from base, ending abruptly near termen, cut by thick oblique dark brown bars in middle and close before extremity; some dark fuscous terminal marks; cilia brownish, with several whitish bars. Hindwings light grey.

Perth, Aberdeen, very local; N. and C. Europe, Asia Minor, N. America; 7.

15. **C. pinellus**, *L.* (*pinetellus*, L.) 19-24 mm. Face with short cone. Forewings ferruginous-ochreous; a shining white broadly dilating median streak from base to $\frac{5}{6}$, cut in middle by a dark brown oblique bar, posterior portion edged with dark brown; second line obscurely brown towards costa; cilia shining brownish. Hindwings light grey.

Britain to Ross, S. Ireland, not common; N. and C. Europe, Asia Minor; 7, 8. Larva dull reddish-grey; spots black; head and plate of 2 black: amongst stems of grasses (*Aira*, *Eriophorum*, etc.); 9-6.

16. **C. margaritellus**, *Hb.* 19-21 mm. Forewings ferruginous-brown, becoming ferruginous-yellow dorsally; a shining white gradually dilating median streak from base to near termen, broadest at $\frac{4}{5}$, thence pointed, upper edge straight; cilia shining pale fuscous. Hindwings light grey.

Devon, Norfolk and Merioneth to Inverness, Ireland, local, commoner northwards; N. and C. Europe; 7, 8.

17. **C. furcatellus**, *Zett.* 19-21 mm. Forewings rather dark ferruginous-fuscous; a rather narrow white median streak from base to $\frac{7}{8}$, broadest at $\frac{2}{3}$, thence pointed, upper edge straight; cilia in ♂ fuscous, in ♀ whitish except base. Hindwings rather dark grey.

Caernarvon to Sutherland, usually above 2000 feet, local; N. and mountains of C. Europe; 7, 8.

18. **C. latistrius**, *Hw.* 21-25 mm. Face with strong sharp cone. Forewings light ferruginous-brown tinged with grey; a shining white evenly broad median streak from base to termen, edged with dark fuscous scales; some blackish terminal dots; cilia shining fuscous, opposite median streak white. Hindwings pale ochreous-grey.

Britain to Perth, local; NC. Europe; 7.

19. **C. perlellus**, *Sc.* (*warringtonellus*, Stt.) 20-27 mm. Face rather prominent. Forewings very shining whitish, often ochreous-tinged; veins and dorsal area often more or less broadly suffused with dark grey; cilia shining white. Hindwings grey, sometimes much suffused with ochreous-whitish, sometimes posteriorly dark grey.

Britain to the Shetlands, Ireland, common; N. and C. Europe, WC. and N. Asia, N. America; 7, 8. Larva light grey-greenish or greyish-ochreous; dorsal line darker; spots brown; head pale yellow-brown, darker-marked: in silken galleries among stems of grasses (*Festuca*, *Aira*, etc.); 9-6.

20. **C. fascelinellus**, *Hb.* (*pedriolellus*, Stt.) 22-28 mm. Antennae in ♂ dentate. Forewings pale yellow-ochreous, towards dorsum fuscous-tinged and mixed with whitish and sometimes dark fuscous; veins suffusedly whitish except near termen; angulated median and second lines yellow-ochreous, irregularly mixed with dark fuscous; sometimes some black terminal dots; cilia fuscous, barred with white. Hindwings pale fuscous.

Norfolk, on coast, very local; C. and SE. Europe; 7. Larva pale grey, segments darker anteriorly; spots blackish-brown; head and plate of 2 brown: in sand-covered silken galleries among stems of grasses (*Triticum junceum* and *Aira canescens*); 9-6.

21. **C. inquinatellus**, *Schiff.* 22-27 mm. Face with sharp cone. Forewings light yellow-ochreous, somewhat mixed with pale brownish, with scattered dark fuscous scales, sometimes more or less wholly suffused with rather dark brown; veins suffusedly paler or whitish-ochreous, especially median; angulated median and second lines indistinct, brownish, marked with dark fuscous below middle; a terminal series of black dots; cilia rather dark shining fuscous, in ♀ paler. Hindwings grey.

Britain to Perth, common; C. and S. Europe, WC. Asia to Turkestan; 7-9. Larva dull grey-greenish to purplish-brown; spots large, darker; head dark brown or blackish: in silken galleries amongst stems of grasses; 3-5.

22. **C. geniculeus**, *Hw.* 19-24 mm. Face with short cone. Forewings light ashy-grey irrorated with brown, often obscurely streaked on veins or sometimes almost wholly suffused with pale yellow-ochreous; median vein suffusedly whitish-ochreous; acutely angulated median and second lines ferruginous-ochreous, mixed or suffused with dark fuscous, median with a darker spot below middle, second posteriorly pale-edged, angulated inwards near dorsum; a terminal series of black dots; cilia metallic grey. Hindwings light grey.

Britain to Perth, Ireland, rather local; C. and S. Europe, Syria; 7-9. Larva pale brown-grey or reddish-grey; dorsal line darker; spots dark brown; head and plate of 2 black: in silken galleries among stems of grasses; 10-4.

23. **C. contaminellus**, *Hb.* (*cantiellus*, Tutt.) 17-23 mm. Differs from *C. salinellus* as follows: forewings without blackish submedian streak from base, median line less oblique, with more strongly marked discal indentation, nearly parallel to second.

Britain to the Clyde, local; Europe, WC. Asia to N. Persia; 7, 8.

24. **C. salinellus**, *Tutt.* 18-24 mm. Forewings ochreous; veins variably pale or whitish, interneural spaces sometimes blackish-sprinkled; a blackish streak beneath median vein from base to middle; lines obscurely darker, on lower half blackish-mixed, median very strongly curved, very oblique dorsally, second curved, slightly indented below middle; three or four black dots on lower half of termen; cilia ochreous, mixed with white. Hindwings whitish-grey or very pale grey.

England to Lancashire, in salt-marshes, local; Germany; 6-9. Larva pale ochreous-grey; dorsal line darker; spots light brownish; head light or dark brown, darker-marked; plate of 2 sometimes dark brown: in silken galleries along stems of *Poa maritima* and *P. Borreri*; 5-7.

25. **C. tristellus**, *F.* 22-29 mm. Face with short cone. Forewings pale or deep yellow-ochreous, often mixed and sometimes wholly suffused with dark brown; median vein and 1b pale or whitish; second line indistinctly brownish, acutely angulated, sometimes obsolete; sometimes some indistinct blackish terminal dots; cilia shining whitish-ochreous to fuscous. Hindwings grey.

Britain to Ross, Ireland, very common; Europe, Asia Minor, N. Asia; 7-9. Larva pale ochreous or brownish; spots large, blackish-brown; head and plate of 2 black: in silken galleries among stems of grasses (*Aira flexuosa*, etc.); 9-6.

26. **C. selasellus**, *Hb.* 22-25 mm. Face slightly prominent. Forewings whitish-ochreous or ochreous, mixed or sometimes much suffused with light fuscous; a moderately thick well-defined white median streak from base to $\frac{3}{4}$ or $\frac{5}{6}$, terminating in two or three fine whitish streaks on veins; sometimes some indistinct blackish terminal dots; cilia shining fuscous. Hindwings grey.

England to Cumberland, N. Ireland, in wet meadows, rather local; N. and C. Europe, N. Asia; 7, 8. Larva brown, paler laterally; spots large, dark brown; head black; plate of 2 black-brown: in silken galleries among stems of grasses (*Poa maritima*, etc.); 3-5.

3. PLATYTES, *Gn.*

Face rounded. Antennae in ♂ ciliated. Forewings: 7

separate, 8 and 9 sometimes coincident. Hindwings: 4 and 5 stalked or coincident, 7 out of 6.

A small genus, not yet recognised outside Europe.

Forewings with white central streak . 1. *alpinella.*
„ without paler central streak . 2. *cerussella.*

1. **P. alpinella**, *Hb.* 17-20 mm. Forewings with apex strongly triangularly produced; brown, mixed with dark fuscous and whitish; a white longitudinal central streak, posteriorly suffused; median and second lines sharply angulated outwards above middle and above dorsum, median dark ochreous-brown, blackish on lower edge of central streak, second white, edged with dark brown, in disc posteriorly with blackish; cilia silvery-metallic towards middle. Hindwings grey.

Hants, Norfolk, I. of Man, on sandy coasts, very local; C. Europe; 7, 8.

2. **P. cerussella**, *Schiff.* 12-14 mm. Forewings with termen slightly sinuate; in ♂ grey-brown or ochreous-brown, in ♀ whitish much sprinkled with fuscous towards costa and termen; median and second lines angulated outwards above and below middle, median ferruginous-brown, second somewhat pale, edged with ferruginous-brown; three black terminal dots below middle; cilia metallic. Hindwings grey or fuscous.

England to Lancashire, in dry grassy places, local; Europe, WC. Asia to N. Persia; 6, 7. Larva pale pinkish-ochreous, light fuscous, or brown-greenish; dots darker; head yellowish or yellow-brown, sometimes brown-marked: amongst roots of grass (*Festuca* ?); 4, 5.

4. EUCHROMIUS, *Gn.*

Face with conical horny projection. Antennae in ♂ ciliated. Forewings: 7 separate; in ♂ with a semitransparent patch in cell towards base. Hindwings: 4 and 5 stalked, 7 out of 6.

A genus of about a dozen species, characteristic of the Mediterranean coasts, but one species has spread widely, probably by artificial means.

1. **E. ocelleus**, *Hw.* 19-22 mm. Forewings light brownish-ochreous, somewhat blackish-sprinkled, posteriorly whitish and thickly black-sprinkled; two parallel sinuate ochreous-yellow silver-grey-margined postmedian transverse streaks, enclosing a whitish streak; two angulated grey subterminal lines, becoming ochreous-yellow towards costa; a terminal series of golden-metallic spots, partially preceded by black marks. Hindwings whitish, more or less suffused with grey.

Britain to Dumfries, very scarce, almost certainly accidentally imported; S. Europe, WC. Asia to Turkestan, Africa, N. America, Australia, Hawaiian Islands; 9-3. The larval habits are unknown; from the available evidence, however, it seems likely that the species is introduced in the pupa state amongst the packing material of grocery-cases from the Mediterranean, where it is alone native. If this should be confirmed, the insect ought to be excluded from British lists.

5. CHILO, *Zk.*

Face with conical horny projection. Tongue short. Antennae in ♂ ciliated. Forewings: 7 separate. Hindwings: 4 and 5 connate or stalked, 7 closely approximated or connate with 6.

A small but very generally distributed group; there are only two European species.

Forewings with pale darker-edged costal streak	2. *cicatricellus.*
„ without pale costal streak .	1. *phragmitellus.*

1. **C. phragmitellus,** *Hb.* ♂ 23-28 mm., ♀ 29-37 mm. Labial palpi longer than head and thorax. Forewings in ♀ much narrower and more acute than in ♂; pale ochreous, more or less suffused with brown, especially in ♂, tending to form dark streaks on and between veins; a dark fuscous discal dot; termen sinuate. Hindwings pale whitish-ochreous or whitish, in ♂ fuscous-tinged.

England to York, local; C. Europe, WC. Asia to Turkestan; 6, 7. Larva ochreous-whitish; dorsal, subdorsal, and lateral lines reddish-brown; head and plate of 2 yellowish-brown: in stems of *Phragmites* and *Glyceria*; 9-5.

2. **C. cicatricellus,** *Hb.* 25-32 mm. Labial palpi shorter than head and thorax. Forewings varying from pale ochreous to brown, darker-sprinkled; a paler costal streak, edged beneath with darker suffusion; a darker pale-circled discal dot; a posterior transverse series of dark dots, sometimes obsolete; termen in ♀ slightly sinuate. Hindwings whitish, often suffused with grey.

Kent, scarce and local; C. Europe; 7. Larva whitish, reddish-tinged; dorsal line dark reddish; head ochreous; plate of 2 ochreous, posteriorly black-spotted: in stems of *Scirpus lacustris*; 5, 6.

4. PYRAUSTIDAE.

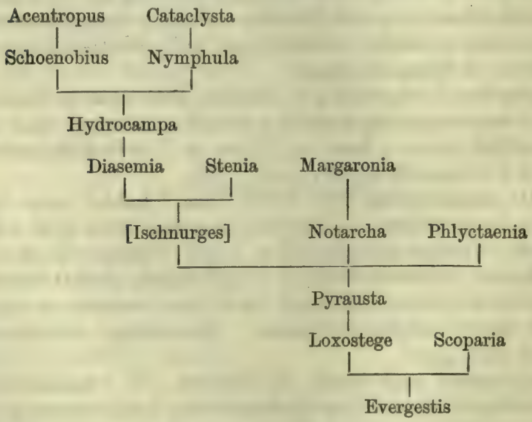
Ocelli and maxillary palpi almost always developed. Antennae in ♂ filiform or serrate, ciliated. Forewings: 1b simple or rarely obsoletely furcate, 4 and 5 closely approximated or rarely stalked, 7 separate. Hindwings without defined pecten of hairs on lower margin of cell (but sometimes with loose scattered hairs), 4 and 5 closely approximated or stalked, 7 rising out of 6 near origin, anastomosing with 8.

This is an exceedingly large family, common in all parts of the globe, but much more numerous within the tropics, where it rivals the *Plusiadae* and *Papilionina.* Imago with forewings distinctly triangular, not usually very elongate or narrow; neuration very uniform. The species mostly fly about sunset, and are generally easily disturbed by day.

Ovum more or less flattened-ovate, smooth or finely pitted or reticulated. Larva rather slender, generally very shining and translucent, with few hairs; usually feeding in a slight web or amongst spun leaves, occasionally in stems or roots, or aquatic; not unfrequently dead or decaying leaves are preferred to fresh ones. Pupa usually in a cocoon above ground, sometimes subterranean.

The diagram explains the phylogeny of the principal genera.

PHYLOGENY OF PYRAUSTIDAE.


Acentropus
Cataclysta
Schoenobius
Nymphula
Hydrocampa
Diasemia
Stenia
Margaronia
[Ischnurges]
Notarcha
Phlyctaenia
Pyrausta
Loxostege
Scoparia
Evergestis

TABULATION OF GENERA.

1. Posterior tibiae in ♂ with outer middle-spur rudimentary . . 2.
„ „ „ outer middle-spur developed . . 3.

2. Forewings with 10 rising out of 9 14. Perinephela.
„ „ 10 separate 15. Phlyctaenia.
3. Forewings with 10 rising out of 9 . . 4.
„ „ 10 separate . . . 9.
4. Ocelli obsolete . . . . 4. Cataclysta.
„ distinct . . . . . 5.
5. Tongue obsolete . . . . 3. Donacaula.
„ developed . . . . 6.
6. Posterior tibiae in ♂ with outer middle-spur $\frac{1}{6}$. 13. Eurrhypara.
„ „ „ with outer middle-spur $\frac{1}{2}$-$\frac{2}{3}$. 7.
7. Labial palpi ascending . . . 5. Nymphula.
„ „ porrected . . . . 8.
8. Antennae almost 1 . . . 8. Stenia.
„ $\frac{3}{4}$ . . . . 17. Psammotis.
9. Face forming a horny prominence . . 10.
„ without horny prominence . . . 11.
10. Forewings with large dorsal scale-tooth . 22. Cynaeda.
„ without large scale-tooth . 21. Loxostege.
11. Abdomen in ♂ with large dense genital tuft 10. Margaronia.
„ „ without such tuft . . 12.
12. Antennae over $\frac{4}{5}$ . . . . 9. Antigastra.
„ $\frac{3}{4}$ or less . . . . 13.
13. Labial palpi ascending . . . . 14.
„ „ porrected . . . . 16.
14. Terminal joint of labial palpi triangularly tufted 11. Agrotera.
„ „ „ „ not tufted . 15.
15. Terminal joint of palpi short, thick, obtuse 12. Notarcha.
„ „ „ moderate, slender, somewhat pointed 6. Hydrocampa.
16. Labial palpi dilated towards apex 1. Acentropus.
„ „ not dilated terminally . . 17.
17. Maxillary palpi triangular or with defined apical dilation . . . 18.
„ „ filiform or with apex loosely penicillate . . . . 21.
18. Terminal joint of labial palpi exposed . . 19.
„ „ „ „ concealed in scales of second . 20.
19. Second joint of labial palpi tufted beneath 23. Scoparia.
„ „ „ „ with scales diminishing throughout 2. Schoenobius.

20. Middle tibiae in ♂ dilated . . 20. MECYNA.
„ „ „ normal . 25. MESOGRAPHE.
21. Maxillary palpi nearly equal to labial 24. EVERGESTIS.
„ „ much shorter than labial . . 22.
22. Terminal joint of labial palpi exposed . 7. DIASEMIA.
„ „ „ „ concealed in scales of second . . 23.
23. Forewings in ♂ with scaled groove near base 19. MICROSTEGA.
„ „ without groove . . 24.
24. Hindwings $1\frac{1}{3}$-$1\frac{1}{2}$ . . . 16. NOMOPHILA.
„ hardly over 1 . . . 18. PYRAUSTA.

1. ACENTROPUS, *Curt.*

Tongue absent. Antennae $\frac{2}{3}$. Labial palpi porrected, dilated with rough scales towards apex. Maxillary palpi very short, loosely scaled. Tibial spurs short, slender. Wings in ♀ sometimes much abbreviated.

A very small genus, characteristic of Europe; the species are probably much overlooked. There is no affinity whatever in structure with the *Trichoptera* (caddis-flies), as was once vaguely imagined. Larva aquatic.

1. **A. niveus,** *Ol.* 12-16 mm. Forewings whitish, veins and costa obscurely brownish. Hindwings whitish. Wings in ♀ often rudimentary, but sometimes larger than in ♂, up to 23 mm.

Britain to Caledonian Canal, N. Ireland, local; C. Europe; 6-8. Larva light olive-green; head light brown: between spun leaves of *Potamogeton;* 9-7. The development of the wings of the ♀ appears to vary considerably, but under what circumstances is still uncertain.

2. SCHOENOBIUS, *Dup.*

Face tufted. Tongue very short or obsolete. Antennae in ♂ $\frac{3}{5}$, in ♀ less than $\frac{1}{2}$. Labial palpi very long, porrected, densely scaled, attenuated towards apex, terminal joint exposed. Maxillary palpi triangularly dilated. Tibial outer spurs $\frac{1}{2}$-$\frac{4}{5}$. Forewings: 11 sometimes anastomosing with 12.

A small but cosmopolitan group, derived from *Hydrocampa.* The resemblance in form and colour to *Chilo* is due to analogy; there is no real relationship. The superficial characters of both are suited to their reed-frequenting habit (compare the reed-dwelling species of *Caradrinidae*); the tendency to anastomosis of veins 11 and 12 is probably a direct effect of the narrowing and extension of the wings.

Forewings with dark fuscous streak from apex 2. *forficellus.*
" without apical streak . . 1. *gigantellus.*

1. **S. gigantellus**, *Schiff.* ♂. 23-28 mm. Forewings fuscous, somewhat ochreous-mixed, sprinkled with dark fuscous; two dark fuscous discal dots transversely placed; an oblique cloudy darker streak from costa before apex to disc, darker on veins. Hindwings whitish; a cloudy posterior line and termen fuscous.

♀. 38-42 mm. Forewings light ochreous-brown or yellowish-brown; posterior streak as in ♂, but very indistinct. Hindwings white.

Suffolk, Norfolk, Cambridge, York, local; C. Europe, WC. Asia to Turkestan; 7. Larva pale yellowish, greyish-tinged; head and plate of 2 yellowish-brown: in stems of *Phragmites*; 5, 6.

2. **S. forficellus**, *Thnb.* 23-27 mm. Forewings very acute in ♀; pale ochreous-yellowish, tinged or sprinkled with brown, more strongly brownish beneath costa; two dark fuscous discal dots transversely placed, upper sometimes absent; sometimes a dark fuscous dot in disc before middle, and two or three on fold; an oblique dark fuscous streak from apex to disc. Hindwings ochreous-whitish.

England to York, W. and S. Ireland, rather common; C. Europe, WC. Asia to Turkestan, N. America; 6, 7. Larva greyish-green; dorsal line dark green; head black; 2 with black spots: in stems of *Glyceria aquatica*; 5, 6.

3. Donacaula, *Meyr.*

Tongue obsolete. Antennae in ♂ $\frac{3}{5}$, in ♀ $\frac{1}{2}$. Labial palpi very long, porrected, densely scaled, attenuated towards apex, terminal joint exposed. Maxillary palpi triangularly dilated. Tibial outer spurs $\frac{2}{3}$. Forewings: 10 out of 9, 11 sometimes anastomosing with 12. Hindwings: 4 and 5 sometimes stalked.

Contains only one European species, correlated with the preceding genus.

1. **D. mucronella**, *Schiff.* 23-27 mm. Forewings brown; an ochreous-whitish costal streak, edged below with dark fuscous suffusion. Hindwings fuscous-whitish.

Kent to Berks and Lancashire, Kirkcudbright, W. Ireland, local; C. Europe, WC. Asia to Turkestan; 7. Larva in stems of *Phragmites*; 6.

4. CATACLYSTA, *Hb.*

Ocelli obsolete. Antennae $\frac{2}{3}$. Labial palpi ascending, second joint with appressed scales, terminal slender, somewhat pointed. Maxillary palpi filiform. Tibial outer spurs $\frac{3}{4}$. Forewings: 10 out of 9.

Probably Indo-Malayan in origin, but species occur in all principal regions, though only one in Europe. In exotic forms veins 5 and 7 of hindwings sometimes disappear by coincidence with 4 and 8 respectively. Larva aquatic.

1. **C. lemnata**, *L.* 17-21 mm. Forewings in ♂ whitish, with a yellowish-fuscous discal dot, traces of lines, and a pale brownish terminal streak; in ♀ pale brownish, ochreous-mixed, with a darker discal spot, lines very indistinct, whitish, darker-edged, a whitish subterminal streak. Hindwings white; a dark fuscous discal dot; lines outlined with fuscous, sometimes nearly obsolete, first preceded by a yellow or fuscous spot in disc; subterminal and terminal ochreous lines enclosing a black fascia marked with four bluish-silvery dots.

Britain to the Clyde, Ireland, common; C. Europe; 6-8. Larva dark green or blackish; dorsal line black; head pale brown: in portable oval case of leaf-fragments, on *Lemna;* 10-5.

5. NYMPHULA, *Schrk.*

Antennae $\frac{2}{3}$. Labial palpi ascending, second joint with projecting scales beneath, terminal slender, somewhat pointed. Maxillary palpi with apex loosely scaled. Tibial outer spurs $\frac{1}{2}$. Forewings: 10 out of 9.

Principally Indo-Malayan, but stragglers occur in all the main regions. Larva aquatic, sometimes breathing by branchiae; when young, mining in leaves.

First line of hindwings strongly marked . 1. *stagnata.*
" " " absent . . 2. *stratiotata.*

1. **N. stagnata**, *Don.* 19-23 mm. Forewings white; costal edge and sometimes a subcostal line dark fuscous; a curved dark fuscous subbasal line; lines and transverse discal spots strongly outlined with dark fuscous, sometimes partly brownish, first curved, second indented below middle, connected by a prolongation with discal spot and first line, lines sometimes also connected on dorsum; a yellow-ochreous dark-margined terminal streak. Hindwings as forewings, but lines narrower, not connected, subbasal absent, discal mark oblique, narrow, dark fuscous, usually touching first line.

Britain to the Clyde, Ireland, common; N. and C. Europe, N. Asia; 6, 7. Larva bright yellow or brownish-yellow; dorsal line dark brownish; head pale brown: amongst spun leaves of *Sparganium*, below surface of water; 8-5.

2. **N. stratiotata**, *L.* 20-25 mm. Forewings pale ochreous-brownish, sometimes partly suffused with white in disc; lines white, first indistinct, posteriorly partly edged with dark brown, second sinuate, anteriorly suffusedly edged with dark brown; a white discal spot, edged with dark fuscous; a white subterminal streak. Hindwings white; a thick dark fuscous postmedian line; a fine dark subterminal line; termen yellow-tinged.

England to York, Ireland, common; C. Europe; 6-9. Larva with eight series of groups of fleshy filaments, serving as branchiae; whitish-ochreous or pale greenish, slightly purplish-freckled; dorsal line rather dark grey; head pale brown: in a web amongst leaves of *Potamogeton*, *Anacharis*, *Ceratophyllum*, etc., below surface of water; 7-5. The larva continually undulates the body rapidly for about twenty seconds, at intervals of from one to three minutes, a movement connected with respiration.

6. HYDROCAMPA, *Latr.*

Antennae $\frac{2}{3}$. Labial palpi ascending, second joint with projecting scales beneath, terminal slender, somewhat pointed. Maxillary palpi loosely scaled, pointed. Tibial outer spurs $\frac{3}{4}$.

A small European genus. Larva aquatic, at first mining leaves.

1. **H. nymphaeata**, *L.* 23-30 mm. Forewings varying from yellow-ochreous to rather dark fuscous; basal area with dentate white and dark fuscous lines; a white subcostal spot before first line; lines whitish, obscure, dark-margined, first angulated above middle, second with deep abrupt sinuation inwards below middle; median band almost occupied by three white dark-edged blotches; an irregular interrupted white dark-edged and dark-veined subterminal streak. Hindwings as forewings, but base white, median band white except discal spot, second line less sinuate.

Britain to Caledonian Canal, Ireland, common; C. Europe, WC. and N. Asia; 6-8. Larva light brownish; dorsal line darker; head light brown; plate of 2 black-edged: in flat oval floating cases of leaf-fragments, on *Potamogeton*, *Hydrocharis*, *Sparganium*, etc.; 7-6.

7. DIASEMIA, *Hb.*

Antennae ¾, ciliations fasciculated (1½-2). Labial palpi porrected, second joint with dense projecting scales, terminal exposed, pointed. Maxillary palpi with apex loosely scaled. Tibial outer spurs ½-⅔.

A very small but quite cosmopolitan genus; the species range very widely, and must possess unusual powers of adaptation.

Wings strewn with whitish strigulae . 2. *ramburialis.*
,, not strewn with whitish strigulae . 1. *litterata.*

1. **D. litterata,** *Sc.* 17-20 mm. Forewings brown, irregularly mixed with black; lines white, first obsolete towards costa, second with triangular median projection nearly touching tornus, its lower side nearly obsolete; three white spots in disc, first touching first line, second large, triangular, dark-veined, resting on second line below middle, third preceding second line above middle; subterminal line very obscurely whitish. Hindwings as forewings, but first and subterminal lines and second white spot absent.

SW. England to Hants and Pembroke, Suffolk, local; C. and S. Europe (very similar forms which range through Africa, India, the Malayan region, N. Australia, and New Zealand are probably identical); 7.

2. **D. ramburialis,** *Dup.* 15-18 mm. Forewings dark fuscous, blackish-mixed, strewn with ochreous-whitish strigulae; lines white, first ill-defined, obsolete towards costa, second forming a quadrate projection below middle, its sides nearly obsolete; a white spot in middle of disc; white marks preceding second line above and below middle. Hindwings as forewings, but first line and central spot confluent to form a straight fascia, lower part of second line and preceding marks confluent to form another.

Kent to Cornwall, very local, perhaps not resident; S. Europe, S. Asia, Africa, Australia, N. America; 7, 8.

8. STENIA, *Gn.*

Antennae almost 1. Labial palpi porrected, second joint with dense projecting scales attenuated to a point forwards, terminal concealed. Maxillary palpi with apex loosely scaled. Abdomen in ♂ very long. Tibial outer spurs ½. Forewings: 10 out of 9.

A small genus, attached to S. Europe and C. Asia.

1. **S. punctalis**, *Schiff.* 19-23 mm. Forewings varying from brownish-ochreous to rather dark fuscous; lines darker; first straight, second forming a short subquadrate median projection, indented below it, darker on costa; a whitish subcrescentic discal spot. Hindwings as forewings, but lighter, first line absent, discal spot indistinct.

Sussex to Scilly Is., Norfolk, York, near sea-coast, local; C. and S. Europe, Asia Minor to N. Persia, N. Africa; 7, 8. Larva pale yellowish-grey, dorsally greyer; dorsal line darker; spots shining, black-centred; head reddish-brown; plate of 2 dark brown: under silken coverings on dead leaves, grass-stems, etc.; 9-5.

9. Antigastra, *Ld.*

Antennae $\frac{5}{6}$. Labial palpi porrected, second joint with dense projecting scales attenuated to a point forwards, terminal concealed. Maxillary palpi with apex loosely scaled. Anterior femora and tibiae in ♂ roughly hairy inwards; tibial outer spurs $\frac{1}{2}$; tarsi very long.

There is only one species established; it is correlated with the preceding genus.

1. **A. catalaunalis**, *Dup.* 18-20 mm. Forewings pale yellow, veins and margins suffused with ferruginous, sometimes almost obscuring ground-colour; lines ferruginous, second strongly curved outwards on upper $\frac{2}{3}$; small orbicular and discal spot fuscous; cilia whitish, base dark fuscous. Hindwings yellow-whitish, ferruginous-tinged, termen more ferruginous; a cloudy grey postmedian costal spot.

Kent, a rare immigrant only; S. Europe, S. Asia, Malay Archipelago, Africa; 8, 9.

10. Margaronia, *Hb.*

Antennae $\frac{4}{5}$. Labial palpi subascending, second joint with dense projecting scales beneath, terminal concealed. Maxillary palpi terminally dilated, truncate. Abdomen in ♂ with large dense exsertible genital tuft. Tibial outer spurs $\frac{1}{6}$-$\frac{1}{2}$. Forewings: 7 near 9 on basal fourth.

A considerable genus in tropical regions, with stragglers outside; only one species reaches Europe. It is derived from *Notarcha*.

1. **M. unionalis**, *Hb.* 25-29 mm. Head yellow-whitish, face ferruginous beneath. Palpi dark ferruginous, towards base white. Thorax white, shoulders dark ferruginous. Forewings

semitransparent, prismatic white; a narrow dark ferruginous or ochreous-brown costal streak throughout; three minute black dots on anterior half of lower edge of this, and a fourth in disc below third. Hindwings semitransparent, prismatic white; a minute black discal dot.

Kent to Scilly Is., Norfolk, an occasional immigrant only; S. Europe, and warmer regions of Asia, Africa, Australia, and America; 6, 7.

11. AGROTERA, *Schrk.*

Antennae $\frac{3}{4}$. Labial palpi ascending, second joint with dense projecting scales beneath, terminal rather long, apex triangularly tufted in front. Maxillary palpi filiform. Tibial outer spurs $\frac{1}{2}$.

Includes also only one Indian and one Australian species.

1. **A. nemoralis**, *Sc.* 19-22 mm. Thorax pale yellow, orange-spotted. Forewings light ochreous-brown, suffused with purplish anteriorly, more orange-tinged posteriorly; basal area pale yellow, orange-marked, limited by curved dark fuscous first line; second line indistinct, dark fuscous, curved, twice sinuate; a dark ferruginous transverse discal spot; termen rounded-prominent in middle; cilia white, with dark fuscous blotches. Hindwings pale fuscous, base more whitish; two darker lines.

Kent, Sussex, Middlesex, local; C. Europe, WC. Asia; 5-7. Larva olive-green; dorsal line darker; head pale orange-brown: between joined leaves of hornbeam; 6-8.

12. NOTARCHA, *Meyr.*

Antennae $\frac{3}{4}$. Labial palpi ascending, second joint with dense projecting scales beneath, terminal short, thick, obtuse. Maxillary palpi filiform. Tibial outer spurs nearly $\frac{1}{2}$.

An extensive genus within the tropics, elsewhere represented by stragglers, in Europe by one only; derived from *Pyrausta.*

1. **N. ruralis**, *Sc.* (*verticalis*, Schiff.) 30-34 mm. Forewings pale whitish-ochreous, yellowish-tinged; a grey subcostal suffusion and connected orbicular dot; lines rather dark grey, first straight, second serrate, curved, strongly broken inwards beneath middle; a dark grey discal mark, nearly followed by a grey blotch; a grey terminal band, edge parallel to second line. Hindwings with colour, discal mark, and posterior markings as in forewings.

Britain to Caledonian Canal, common; C. and S. Europe,

N. and C. Asia to N. India and China; 7. Larva whitish-green, sides greener; dorsal line darker; head green: amongst spun leaves of *Urtica;* 5.

13. EURRHYPARA, *Hb.*

Antennae $\frac{3}{4}$. Labial palpi subascending, second joint with short dense projecting scales, terminal short, obtuse. Maxillary palpi filiform. Tibial outer middle-spur in ♂ $\frac{1}{6}$, end-spur $\frac{1}{4}$. Forewings: 10 out of 9, in ♂ with dense scale-thickening between 7 and 8 beneath.

Only the one species is known; it is probably correlated with the preceding.

1. **E. urticata,** *L.* 30-32 mm. Head and thorax deep ochreous-yellow, black-spotted. Forewings yellowish-white, markings blackish; base blackish, with two ochreous-yellow marks; a suffused costal streak; lines thick, first irregular, second tending to form spots, curved, narrowest below middle; small orbicular and large round discal spots, touching costal streak; a terminal fascia tending to form spots, edge parallel to second line. Hindwings with colour, second line, and terminal fascia as in forewings; a blackish discal spot.

England to York, Ireland, common; Europe, N. and C. Asia to China; 6, 7. Larva whitish; dorsal line dull green, white-edged; head and plate of 2 black: among spun leaves of *Urtica, Mentha, Marrubium,* etc.; 9.

14. PERINEPHELA, *Hb.*

Antennae $\frac{2}{3}$. Labial palpi porrected, second joint with dense projecting scales attenuated to a point forwards, terminal concealed. Maxillary palpi filiform. Tibial outer middle-spur in ♂ almost obsolete, end-spur $\frac{1}{2}$. Forewings: 10 out of 9.

There is only one species.

1. **P. lancealis,** *Schiff.* 28-31 mm. Forewings whitish-ochreous, mostly suffused with fuscous-grey; lines dark fuscous, first irregular, second serrate, curved, indented below middle, preceded by a clear blotch in disc and edged posteriorly by a clear line; small dark fuscous orbicular and discal marks, separated by a clear patch. Hindwings as forewings, but anterior markings absent.

England to York, local; C. Europe, N. Asia; 6, 7. Larva green; dorsal line darker, broadly edged with grey-whitish or grey; spiracular whitish; head pale brownish, dark-speckled: between spun leaves of *Eupatorium cannabinum;* 8, 9.

15. PHLYCTAENIA, *Hb.*

Antennae $\frac{2}{3}$. Labial palpi porrected, second joint with dense projecting scales attenuated to a point forwards, terminal concealed. Maxillary palpi somewhat dilated at apex. Tibial outer middle-spur in ♂ obsolete, end-spur $\frac{1}{2}$-$\frac{3}{4}$.

A rather considerable genus, characteristic of the Northern hemisphere. Larva feeding in a slight web or among spun leaves; when full fed they often become rosy or flesh-colour.

1. Cilia of forewings white, base dark fuscous 1. *cilialis.*
  „ „ not white . . . . 2.
2. Discal spot of forewings 8-shaped or reniform . 3.
  „ „ narrow, transverse . . 5.
3. Forewings reddish-ochreous . . 4. *ferrugalis.*
  „ not reddish-ochreous . . . 4.
4. Forewings fuscous-grey . . . 5. *prunalis.*
  „ pale whitish-ochreous . . 3. *lutealis.*
5. Forewings yellow-ochreous . . 2. *crocealis.*
  „ not yellow-ochreous . . . 6.
6. Forewings with pale whitish - yellowish blotches . . . . 8. *sambucalis.*
  „ without pale blotches . . . 7.
7. Second line slightly sinuate below middle 6. *terrealis.*
  „ deeply sinuate below middle . 7. *fuscalis.*

1. **P. cilialis**, *Hb.* 22-25 mm. Forewings ferruginous, obscurely streaked with yellowish between veins; costa and termen suffused with fuscous; second line faintly fuscous, curved; cilia white, base dark fuscous. Hindwings pale whitish-yellowish, fuscous-tinged; termen suffused with fuscous.

Cambridge, in fens, very local; C. Europe; 6, 7. Larva yellow; dorsal line olive-green, partly red-tinged; subdorsal reddish-purple; lines continued on head: on *Carex riparia;* 9, 10.

2. **P. crocealis**, *Hb.* 20-23 mm. Forewings yellow-ochreous; lines fuscous, first curved, second curved, strongly sinuate inwards below middle; orbicular dot and linear discal mark fuscous; a dark fuscous terminal line. Hindwings whitish-grey, with faint darker second line.

England, Bute, E. and W. Ireland, common; C. Europe; 7, 8. Larva dull green; dorsal line dark greenish-grey; head black: on *Inula dysenterica;* 4, 5.

3. **P. lutealis**, *Hb.* 21-24 mm. Forewings pale whitish-

ochreous, subcostal vein suffused with ochreous; lines fuscous, first angulated, indistinct, second serrulate, with a deep abrupt sinuation inwards below middle; large orbicular and reniform discal spots somewhat darker, outlined with deeper ochreous; four small fuscous marks on costa posteriorly; a faint darker praesubterminal line, thickened and darker ochreous or fuscous towards costa. Hindwings whitish; two grey discal dots, first faint; grey second and subterminal lines; a dark grey apical blotch.

Britain to the Orkneys, Ireland, common; N. and C. Europe; 7, 8. Larva green; dorsal line darker; subdorsal broad, pale yellow; head pale yellow-brownish, darker-marked: on *Rubus*, *Centaurea*, *Plantago*, etc.; 5, 6.

4. **P. ferrugalis**, *Hb.* 19-22 mm. Forewings reddish-ochreous, suffused with reddish-ochreous-brown; lines serrate, blackish, first angulated, second curved, with a deep abrupt sinuation inwards below middle; orbicular and 8-shaped discal spots outlined with blackish; a fuscous subterminal line, thicker and darker towards costa. Hindwings grey; two discal dots and second line darker; a dark grey apical suffusion.

Britain to the Clyde, N. and E. Ireland, rather common; C. and S. Europe, WC. Asia to N. India, Africa, N. America; 6, 9, 10. Larva rather dark green; dorsal line darker, edged with ochreous-whitish; subdorsal whitish; 2 with four black spots, first two elongate; head pale brownish-ochreous, dark-speckled: on *Stachys*, *Eupatorium*, *Fragaria*, etc.; 7-10.

5. **P. prunalis**, *Schiff.* 21-24 mm. Forewings fuscous-grey, base brownish; first line indistinct, second serrate, blackish, curved, with a narrow deep sinuation inwards below middle, on dorsum whitish-edged posteriorly; orbicular and 8-shaped discal spots darker grey; costa posteriorly spotted with darker and sometimes whitish. Hindwings fuscous-grey, apex darker; two dark fuscous discal dots; a faint second line.

Britain to the Orkneys, Ireland, common; C. Europe; 6, 7. Larva bright deep green; subdorsal line shining white; head grey-whitish: on *Urtica*, elm, *Teucrium*, *Stachys*, etc.; 10-5.

6. **P. terrealis**, *Tr.* 22-26 mm. Forewings fuscous; first line indistinct, second dark fuscous, strongly curved outwards from near costa to middle, slightly sinuate below this; orbicular dot and linear discal mark dark fuscous; a darker terminal band, edge parallel to second line. Hindwings light fuscous-grey; two darker discal dots, sometimes obsolete; second line and terminal band as in forewings.

Devon, N. England to the Clyde, local; C. Europe, WC. Asia, N. America; 7. Larva pale green; dorsal and several slender lateral lines darker: on *Solidago virgaurea*; 8, 9.

7. **P. fuscalis**, *Schiff.* 19-24 mm. Forewings grey, slightly yellowish-tinged; lines darker grey, first indistinct, hardly curved, second serrate, strongly curved in disc, with an abrupt sinuation inwards below middle, posteriorly obscurely whitish-edged, more strongly on costa; orbicular dot and transverse discal mark indistinct, darker grey. Hindwings pale grey, yellowish-tinged; two very faint discal dots; second line as in forewings; a darker grey terminal band.

Britain to the Hebrides, Ireland, common; N. and C. Europe, WC. and N. Asia; 6. Larva rather dark fuscous; dorsal line darker; spiracular area pale brownish; head and plate of 2 blackish-brown: on flowers and seeds of *Melampyrum* and *Rhinanthus*; 7, 8.

8. **P. sambucalis**, *Schiff.* 21-24 mm. Forewings dark fuscous, sprinkled with yellow-whitish; first line indistinct, preceded by a whitish dot; second dark fuscous, posteriorly with a waved whitish-yellowish edging, middle third forming a quadrangular projection including a pale whitish-yellowish blotch, below this with a loop inwards enclosing a whitish-yellowish spot; orbicular dot and transverse discal mark darker, separated by a square whitish-yellowish spot. Hindwings as forewings, but anterior markings obsolete, posterior pale blotches much enlarged.

England to York, Ireland, common; C. Europe, WC. and N. Asia; 6, 7. Larva whitish-green; dorsal and subdorsal lines green; incisions yellowish; on 3 and usually 4 a black lateral spot: on elder (*Sambucus*); 9.

16. NOMOPHILA, *Hb.*

Antennae $\frac{2}{3}$. Labial palpi porrected, second joint with dense projecting scales attenuated to a point forwards, terminal concealed. Maxillary palpi filiform. Tibial outer spurs under $\frac{1}{2}$. Hindwings $1\frac{1}{3}$-$1\frac{1}{2}$.

There is only one species; the forewings are extremely elongate and narrow, a structure probably caused by adaptation to a grassy habitat.

1. **N. noctuella**, *Schiff.* (*hybridalis*, Hb.) 23-31 mm. Forewings brown, sometimes whitish-sprinkled; an indistinct dark fuscous median streak from base to first line; lines indistinct, blackish-marked, second indented above middle, with a deep sinuation inwards below middle; two large 8-shaped darker

blackish-edged spots between them. Hindwings light brown; termen suffused with dark fuscous; a darker discal crescentic mark.

Britain to the Orkneys, Ireland, common but irregular; Europe, Asia, Africa, America, Australia; 6-9. Larva olive-ochreous; dorsal line darker, pale-edged; spots large, black, pale-edged; head reddish-brown or dark brown, black-marked: on *Polygonum aviculare* (?) and probably grasses; 8-10.

17. PSAMMOTIS, *Hb.*

Antennae $\frac{3}{4}$. Labial palpi porrected, second joint with dense projecting scales attenuated to a point forwards, terminal concealed. Maxillary palpi filiform. Tibial outer spurs $\frac{2}{3}$. Forewings: 10 out of 9.

The two European species constituting this genus are hardly a natural group, and might perhaps be merged with *Pyrausta*.

Forewings much sprinkled with fuscous . 1. *pulveralis*.
,, not sprinkled with fuscous . 2. *hyalinalis*.

1. **P. pulveralis**, *Hb.* 21-23 mm. Forewings pale yellow-ochreous, much sprinkled with fuscous; first line indistinct, second fuscous, somewhat curved; orbicular and discal spots very obscure, fuscous; cilia ochreous-whitish, with two distinct fuscous lines. Hindwings as forewings, but ground more whitish, first line and spots obsolete.

Kent, I. of Wight, Norfolk, Cambridge, Lancashire, local and scarce; C. and S. Europe, Asia Minor to N. Persia; 6, 7. Larva on *Mentha aquatica;* 8.

2. **P. hyalinalis**, *Hb.* 26-32 mm. Forewings pale yellowish, costa suffusedly greyish-yellow; lines grey, first bent, second subserrate, curved, sinuate-indented below middle; small orbicular and oblong discal spot grey; subterminal line grey, sometimes suffused into termen. Hindwings whitish-yellowish; second and subterminal lines as in forewings.

S. England to Norfolk and Merioneth, local; C. and S. Europe, N. Asia; 7. Larva whitish, hardly green-tinged; dots black, on shining tubercles; head pale brown-reddish: on *Centaurea nigra;* 8-5.

18. PYRAUSTA, *Schrk.*

Antennae $\frac{2}{3}$-$\frac{3}{4}$. Labial palpi porrected, second joint with dense projecting scales attenuated to a point forwards, terminal concealed. Maxillary palpi slightly dilated at apex. Tibial outer spurs $\frac{1}{3}$-$\frac{3}{4}$.

A very large and nearly cosmopolitan genus, but mainly characteristic of northern temperate regions.

1. Forewings purple or with crimson fasciae . 2.
,, without purple or crimson markings . 4.
2. Forewings ochreous with two crimson fasciae . . . 4. *sanguinalis.*
,, purple with yellowish markings . 3.
3. Hindwings with a pale discal spot . 5. *purpuralis.*
,, without pale discal spot . 6. *aurata.*
4. Wings with a white postmedian fascia . . 5.
,, without white fascia . . . 6.
5. Fascia irregular, one or two white spots . 3. *nigrata.*
,, even, no white spots . . 2. *cingulata.*
6. Wings black, with two large white spots each . 1. *octomaculata.*
,, without large white spots 7.
7. Lines of forewings wholly absent . 8. *alpinalis.*
,, ,, not wholly absent . . 8.
8. Posterior half of costa pale with dark dots . 9.
,, ,, not dotted . . 10.
9. A quadrate white spot in middle of disc . 10. *olivalis.*
No white spot in disc . . . 9. *decrepitalis.*
10. Hindwings whitish . . . 11. *repandalis.*
,, not whitish . . . . 11.
11. Hindwings yellowish or with pale markings . 12.
,, grey, without pale markings . 16. *asinalis.*
12. Discal mark of forewings linear . . . 13.
,, ,, ,, not linear . . 15.
13. Hindwings with broad pale postmedian fascia . . . 15. *nubilalis.*
,, without broad pale fascia . . 14.
14. Forewings dark fuscous . . . 13. *stachydalis.*
,, deep ochreous-yellow . . 14. *verbascalis.*
15. Forewings yellow . . 12. *flavalis.*
,, brown or grey . 7. *cespitalis.*

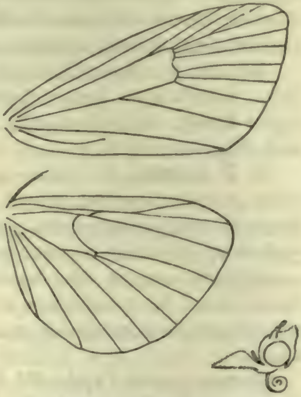
1. **P. octomaculata,** *F.* 19-21 mm. Forewings black; a large round white subdorsal spot before middle, and a second in disc beyond middle; sometimes a white dot above first; cilia white towards tips. Hindwings as forewings, but without the white dot.

England, Ireland, rather local; N. and C. Europe, WC. and N. Asia, N. America; 6, 7. Larva ochreous-whitish; dorsal line deep green; subdorsal and lateral green; spiracular whitish-green; dots green; head whitish-brown: in a slight web beneath lower leaves of *Solidago*; 8, 9.

2. **P. cingulata**, *L.* 13-16 mm. Forewings blackish; a narrow very slightly sinuate white fascia beyond middle; tips of cilia white. Hindwings as forewings, but fascia slightly curved.

Britain to Perth, W. Ireland, rather local; Europe, Asia Minor; 5, 7, 8. Larva in a web beneath lower leaves of *Salvia pratensis*; 6, 9.

3. **P. nigrata**, *Sc.* (*anguinalis*, Hb.) 13-16 mm. Forewings black, strewn with ferruginous-brown scales; a small white subdorsal spot at ⅓, and a second (sometimes nearly obsolete, but distinct on lower surface) in middle of disc; an irregular sinuate white fascia beyond middle; cilia white towards tips. Hindwings as forewings, but without subdorsal spot, fascia more regular, curved.



Neuration and head of *Pyrausta purpuralis.*

S. England to Cambridge and Hereford, Westmoreland, Cumberland, W. Ireland, local; Europe; 5, 8. Larva dull purplish; spots black; head and plate of 2 shining olive-green: in a slight web beneath leaves of *Thymus* and *Origanum*; 6, 7, 9, 10.

4. **P. sanguinalis**, *L.* 13-17 mm. Forewings brownish-ochreous, basal and dorsal areas deep yellow, disc yellow-mixed; markings purple-crimson; a streak along costa to ¾; a fascia before middle; an oblong discal spot, connected above with costal streak, and sometimes beneath with preceding fascia; a subterminal fascia. Hindwings in ♂ light grey, darker terminally, in ♀ grey; termen crimson in middle.

Flint to Lancashire, W. Ireland, local; C. and S. Europe, Asia Minor to Turkestan; 6, 8. Larva greenish-grey, reddish-tinged; subdorsal and spiracular lines whitish; head brown: on flowers of *Thymus*; 7, 9, 10.

5. **P. purpuralis**, *L.* (*ostrinalis*, Hb.) 14-20 mm. Forewings purple, more or less mixed with dark grey; markings ochreous-yellow, black-edged; an oblique fascia near base, not reaching

costa; a spot in middle of disc; an irregular postmedian fascia, sometimes broken into three spots; sometimes a subterminal streak, not reaching apex. Hindwings black, base sometimes suffused with whitish-ochreous; a discal spot and curved postmedian fascia whitish-ochreous; sometimes a whitish-ochreous subterminal streak, sometimes purple in middle.

Britain to Ross, Ireland, common; Europe, Asia Minor; 5-8. Larva dark grey; dorsal and spiracular lines yellowish; spots black, whitish-edged: between leaves of *Mentha arvensis* and *Thymus;* 6, 7, 9.

6. **P. aurata,** *Sc.* (*punicealis,* Schiff.) 14-17 mm. Forewings deep purple, blackish-mixed; a basal dorsal patch mixed with ferruginous; sometimes a yellow dot in middle of disc; a round yellow spot in disc beyond middle, a costal mark above it, and sometimes one or two beneath towards dorsum. Hindwings black, basal hairs ochreous-whitish; a yellow postmedian fascia, sometimes not reaching margins; some purple subterminal scales.

Britain to the Clyde, W. Ireland, rather local; Europe, Asia Minor to N. Persia; 5, 7, 8. Larva dull green; dorsal line yellowish-edged; spiracular broad, yellowish; dots black, yellowish-edged; head and plate of 2 pale brownish, black-freckled: in a web amongst flowers of *Nepeta cataria;* 6, 9.

7. **P. cespitalis,** *Schiff.* 13-18 mm. Forewings brownish-grey or brown, sometimes blackish-sprinkled; first line obscurely pale or obsolete; second in ♂ pale greyish-ochreous, often obsolete except on costa, in ♀ whitish-ochreous, dilated on costa; small orbicular and oval discal spot rather darker, in ♀ sometimes separated by a pale spot; sometimes a pale subterminal streak. Hindwings in ♂ grey, in ♀ blackish; sometimes a darker discal dot; a curved postmedian fascia and subterminal streak in ♂ obscurely ochreous-whitish, in ♀ whitish-ochreous.

Britain to the Orkneys, Ireland, very common; Europe, WC. Asia; 5, 7, 8. Larva dull brownish-black; dorsal line double, grey; spiracular dull ochreous; spots black, grey-circled; head and plate of 2 brown, darker-freckled: in silken galleries beneath leaves of *Plantago;* 6, 8, 9.

8. **P. alpinalis,** *Schiff.* (*uliginosalis,* Stph.) 23-29 mm. Forewings light grey-brownish; sometimes an indistinct round ochreous-whitish spot in disc beyond middle. Hindwings in ♂ whitish-grey, a faint posterior line and terminal suffusion grey; in ♀ grey, sometimes whitish towards costa beyond middle.

Perth to Ross, common on mountains; mountains of C. Europe and C. Asia; 7, 8. Larva yellowish; spots black: amongst spun leaves of *Senecio;* 6.

9. **P. decrepitalis**, *HS.* 21-25 mm. Forewings very pale greyish-ochreous, brownish-sprinkled, costa more brownish; lines fuscous, first indistinct, second serrate, slightly curved; round orbicular and 8-shaped discal spot brownish, darker-edged; posterior half of costa pale, dotted with fuscous; a subterminal sometimes broad brownish suffusion. Hindwings whitish-grey; two dark grey discal dots; second line and subterminal suffusion as in forewings.

Perth to Ross, on mountains, local; N. and mountains of C. Europe; 6, 7. Larva pale yellow; dorsal line green, whitish-edged; subdorsal green; lateral and spiracular whitish; head pale yellowish: in a slight web beneath fronds of *Lastrea spinulosa;* 7, 8.

10. **P. olivalis**, *Schiff.* 22-25 mm. Forewings greyish-ochreous or brownish, densely sprinkled with dark fuscous; lines hardly darker, indistinct, second serrate, often posteriorly whitish-edged, preceded in middle by a white spot, curved, with abrupt deep sinuation inwards below middle; large orbicular and reniform discal spot darker, separated by a subquadrate white spot; posterior half of costa whitish, dotted with dark fuscous. Hindwings white, dorsal half light grey; two dark grey discal dots; a fuscous terminal fascia.

England to York, Ireland, very common; C. Europe, Asia Minor; 6, 7. Larva light green; dorsal line dark green; spots large, black; head and plate of 2 black-freckled: amongst spun leaves of *Stachys*, *Urtica*, *Mercurialis*, etc.; 9-4.

11. **P. repandalis**, *Schiff.* 22-26 mm. Forewings pale whitish-ochreous, costa suffused with pale brownish-ochreous; lines brown, distinct, first somewhat irregular, second sinuate, with a short angular indentation below middle; orbicular dot and narrow discal mark brown, latter touching second line; a subserrate brown subterminal line. Hindwings whitish; a strongly marked grey broken postmedian line; a grey subterminal line.

Devon, local; C. and S. Europe; 7. Larva yellow-whitish, with black dots; head light yellow: amongst spun refuse or in shoots of *Verbascum;* 5, 6.

12. **P. flavalis**, *Schiff.* 23-27 mm. Forewings dull yellow, near costa sometimes grey-mixed; lines grey, first irregular, second subserrate, somewhat curved, triangularly indented

below middle; round orbicular, oblong discal spot, and a small round spot below orbicular outlined with grey; a faint grey subterminal line; cilia often grey. Hindwings pale yellowish, partly suffused with pale grey; sometimes two grey discal dots; second and subterminal lines as in forewings.

Kent to Dorset and Norfolk, local; C. and S. Europe, WC. and N. Asia; 7.

13. **P. stachydalis**, *Zk.* 21-23 mm. Forewings dark fuscous; lines hardly darker, first indistinct, second forming a very strong curve outwards above middle, and a deep abrupt sinuation inwards below it, preceded by a whitish-yellowish spot in the curve, and interruptedly edged posteriorly with whitish-yellowish on upper half; orbicular dot and linear discal mark darker, separated by a whitish-yellowish spot. Hindwings as forewings, but pale spots in disc larger and approximated; a pale costal spot before second line.

S. England to Suffolk and Pembroke, local; C. Europe; 6, 7. Larva green, incisions white; subdorsal line white; spiracular fine, whitish; spots green, whitish-ringed; head whitish: in thick silken tubes on *Stachys sylvatica*; 8, 9.

14. **P. verbascalis**, *Schiff.* 20-24 mm. Forewings deep ochreous-yellow, more or less mixed with fuscous, especially on costa and in disc; lines dark fuscous, second forming a very strong angular curve outwards above middle, enclosing a clear spot; orbicular dot and linear discal mark dark fuscous, separated by a clear spot; a waved fuscous subterminal line. Hindwings as forewings, but first line and orbicular dot absent.

England to York, local; C. Europe, WC. and N. Asia, Japan; 6, 7. Larva green; subdorsal line whitish; spiracular yellow-whitish; spots black-centred; head whitish-ochreous, black-dotted: in a slight web beneath leaves of *Teucrium scorodonia*; 8, 9.

15. **P. nubilalis**, *Hb.* (*lupulinalis*, Gn.) 27-34 mm. Forewings pale yellowish, more or less wholly suffused with grey, reddish-ochreous, or rather dark fuscous; lines darker, second forming a strong serrate curve outwards above middle, followed by a clear serrate streak dilated dorsally; orbicular dot and linear discal mark dark fuscous, often separated by a clear spot. Hindwings rather dark grey, sometimes mixed with whitish-yellowish; a broad whitish-yellowish postmedian fascia.

Middlesex, I. of Wight, Lancashire, probably a casual immigrant only; C. and S. Europe, WC. and N. Asia, Japan; 5, 6.

Larva yellowish-grey; dorsal and lateral lines darker: in stems of *Humulus* and *Cannabis*; 7-10.

16. **P. asinalis**, *Hb.* 25-31 mm. Forewings grey; lines darker, first indistinct, sometimes followed by a dark fuscous triangular subdorsal spot, second sometimes blackish-dotted, curved, with a deep abrupt sinuation inwards below middle, often preceded by a brownish or dark fuscous trapezoidal subdorsal spot; very large orbicular, and reniform discal spot somewhat paler, latter preceded and followed by faint brownish sometimes dark-edged spots. Hindwings grey; a darker postmedian line.

Sussex to Devon and Pembroke, W. Ireland, local; S. Europe; 7. Larva yellow-brownish; dorsal line reddish-brown; subdorsal broader, brown; lateral brown; spots black: in silken tubes beneath leaves of *Rubia peregrina*; 8.

19. MICROSTEGA, *Meyr.*

Antennae $\frac{3}{4}$. Labial palpi porrected, second joint with dense projecting scales attenuated to a point forwards, terminal concealed. Maxillary palpi slightly dilated at apex. Tibial outer spurs $\frac{1}{3}$-$\frac{1}{2}$. Forewings in ♂ with groove beneath cell near base, covered with dense scales from above. Hindwings in ♂ with groove above cell near base, above which is a thick ridge of scales.

Contains only the one species, closely correlated to *Pyrausta*.

1. **M. pandalis**, *Hb.* 23-27 mm. Forewings whitish-yellowish, towards costa suffused with pale grey; lines grey, first irregular, second subserrate, sinuate; orbicular dot and discal mark grey, sometimes obsolete; a serrate grey subterminal line, limiting a greyish-tinged terminal fascia. Hindwings yellow-whitish; sometimes a grey discal dot; posterior markings as in forewings.

England to York, W. Ireland, common; C. Europe, N. Asia, Japan; 6. Larva light pinkish-ochreous to dark grey, tinged with purplish-brown; dorsal line darker, pale-edged; spots large, black or brown; head black-marked; plate of 2 black: in elongate cases made of pieces cut from a dead leaf, on *Teucrium*, *Origanum*, *Solidago*, etc.; 7, 8.

20. MECYNA, *Stph.*

Antennae $\frac{2}{3}$. Labial palpi porrected, second joint with dense projecting scales attenuated to a point forwards, terminal concealed. Maxillary palpi triangularly dilated, apical scales projecting angularly beneath. Middle tibiae in ♂ much dilated, enclosing tuft of hairs; tibial outer spurs $\frac{1}{2}$-$\frac{3}{4}$.

A small but quite cosmopolitan genus, of which only one species occurs in Europe; correlated with *Pyrausta*.

1. **M. polygonalis,** *Hb.* 27-34 mm. Forewings brown, sometimes reddish-tinged or partially suffused with dark fuscous; lines dark fuscous, first straight, oblique, second waved, rather strongly curved above middle; orbicular dot and narrow transverse discal spot dark fuscous, latter often followed by a large round light space. Hindwings orange; costa and sometimes dorsum suffused with dark grey; a blackish terminal fascia.

Kent, Suffolk, Gloucester, a casual immigrant only; C. and S. Europe, C. and S. Asia, Australia; 6. Larva on *Genista* and *Cytisus;* 7, 8.

21. LOXOSTEGE, *Hb.*

Face with pointed or obtuse conical horny projection. Antennae $\frac{3}{4}$. Labial palpi porrected, second joint with dense projecting scales attenuated to a point forwards, terminal concealed. Maxillary palpi filiform. Tibial outer spurs $\frac{1}{2}$-$\frac{3}{4}$ (in *verticalis* middle-spur $\frac{1}{6}$).

A genus of some size, principally confined to northern temperate regions. Pupa subterranean.

1.	Forewings fuscous . . .	1. *sticticalis.*
	„ yellowish	2.
2.	Hindwings with two dark grey lines .	2. *verticalis.*
	„ without lines . . .	3. *palealis.*

1. **L. sticticalis,** *L.* 22-27 mm. Forewings rather dark fuscous, somewhat ochreous-tinged; first line obsolete, second darker, subserrate, angularly indented below middle, followed on costa by an ochreous-whitish spot; oval orbicular and irregular discal spot darker, separated by an ochreous-whitish spot; a terminal whitish-ochreous streak, projecting above middle. Hindwings rather dark fuscous; a darker postmedian line, sometimes followed by a cloudy whitish streak becoming obsolete beneath; a whitish-ochreous subterminal streak.

England to York, E. Ireland, local; Europe, WC. and N. Asia, N. America; 6-8. Larva grey; dorsal line pale, dark-edged, or dark, pale-edged; subdorsal pale; spiracular pale yellow, enclosing a fine dark grey line; spots pale, blackish-ringed; head and sometimes plate of 2 black: on upper side of leaves of *Artemisia vulgaris* and *A. campestris;* 6, 7.

2. **L. verticalis,** *L.* (*cinctalis,* Tr.) 28-31 mm. Forewings

pale orange-yellowish, costa ochreous-orange; markings ochreous-orange, sometimes grey-tinged; first line indistinct, second serrate, slightly curved, subterminal serrate; orbicular dot-like, discal spot irregular. Hindwings pale yellowish; discal dot and serrate costally dilated second and subterminal lines dark grey.

S. England to Norfolk and Hereford, rather common; C. Europe, WC. and N. Asia; 6, 7. Larva green; spots black; head pale brown, darker-spotted: on *Carduus arvensis*, perhaps also *Cytisus*, *Atriplex*, etc.; 7, 8.

3. **L. palealis**, *Schiff.* 27-31 mm. Forewings pale sulphur-yellow; small orbicular and discal spots, and upper part of second line faintly greyish-tinged. Hindwings sulphur-whitish; a grey costal postmedian spot.

E. England (not W. of Hants) to York and Lancashire, local; C. and S. Europe, WC. and N. Asia, N. Africa; 6, 7. Larva whitish; dorsal line greyish; spots black; head ochreous-whitish, black-dotted: amongst flowers of *Daucus* and *Peucedanum*; 8, 9.

22. CYNAEDA, *Hb.*

Face with slight rounded prominence. Antennae $\frac{2}{3}$. Labial palpi porrected, second joint with loose scales attenuated forwards, terminal concealed. Maxillary palpi rather triangularly dilated. Tibial outer spurs $\frac{1}{2}$. Forewings with large dorsal scale-tuft at $\frac{1}{3}$.

Perhaps contains only one geographically varying species; it is derived from the rather extensive allied genus *Titanio*, with horny projecting frontal plate, which does not reach Britain.

1. **C. dentalis**, *Schiff.* 22-27 mm. Forewings yellow-whitish, partially suffused with pale brownish; two oblique brown marks in disc; second line fine, dark fuscous, very strongly dentate, deeply sinuate inwards below middle, anteriorly partly white-edged, posteriorly edged by an irregular dentate brown band; cilia yellow-whitish, barred with dark fuscous. Hindwings in ♂ whitish-ochreous with indistinct grey dentate postmedian line; in ♀ dark grey.

Kent to Dorset, local; C. and S. Europe, Asia Minor; 7. Larva yellow-whitish; spots black; head and plate of 2 black: in stems of *Echium*; 5.

23. SCOPARIA, *Hw.*

Antennae $\frac{2}{3}$. Labial palpi porrected, second joint with long dense projecting scales beneath, terminal exposed. Maxillary palpi rather long, triangularly dilated. Tibial outer spurs ½. Hindwings from over 1 to nearly 2; veins 4 and 5 connate or stalked.

A large genus, mostly inhabiting temperate regions, or the mountains of warmer countries, most largely developed in New Zealand. The larvae usually feed on lichens and moss, forming galleries. The species are obscurely marked, and sometimes difficult to distinguish. The genus is correlated with *Titanio*.

1. Discal spot absorbed in blackish costal blotch 1. *resinea*.
,, ,, not absorbed in costal blotch . . 2.
2. Discal mark dot-like . . . 9. *pallida*.
,, ,, X-shaped or 8-shaped . . 3.
3. Orbicular dot-like, blackish . . . 4.
,, outlined with blackish . . . 7.
4. Subterminal line interrupted in middle . 7. *crataegella*.
,, ,, not interrupted . . 5.
5. Hindwings with darker discal dot . 2. *lineola*.
,, without discal dot . . . 6.
6. First line followed by dark fascia, second subsinuate 6. *frequentella*.
,, not followed by dark fascia, second angulate-sinuate . . 8. *truncicolella*.
7. Claviform yellowish, black-edged . . 11. *dubitalis*.
,, black . . . . . 8.
8. Upper half of discal mark brownish . . 9.
,, ,, whitish . 5. *murana*.
9. Second line sinuate . . . . 10.
,, angulated . . . . 11.
10. Claviform touching first line . . 3. *angustea*.
,, separate . . . 4. *alpina*.
11. Subterminal line distinct . 12. *ambigualis*.
,, ,, very indistinct . . 10. *cembrae*.

1. **S. resinea,** *Hw.* 16-17 mm. Forewings white, irregularly blackish-mixed; a black triangular mark from base of costa; lines white, dark-edged, first irregular, second strongly sinuate; an irregular blackish costal blotch beyond first including orbicular and claviform, and a quadrate blotch before second concealing discal spot; terminal area blackish, subterminal line white, touching second in middle. Hindwings light grey, darker terminally; a darker discal mark.

England, S. Ireland, rather local; WC. and SW. Europe;

7, 8. Larva greenish-yellow; spots, head, and plate of 2 dark bronzy-brown: on lichens and moss, growing on ash and apple; 5.

2. **S. lineola**, *Curt.* 17-19 mm. Forewings narrow, white or whitish, partially irrorated with blackish; a blackish mark from base of costa; lines whitish, dark-edged, first irregular, rather oblique, second strongly sinuate; orbicular and claviform black, dot-like, latter touching first line; a black X-shaped discal mark; subterminal thick, white, touching second in middle. Hindwings whitish-grey, terminally darker; a grey discal dot.

Britain to the Clyde, E. and W. Ireland, local; France; 8. Larva olive-green; two whitish transverse marks on each segment; dorsal line fine, dark; spiracular grey; spots, head, and plate of 2 black: on lichens, growing on fences and hawthorn; 3-6.

3. **S. angustea**, *Stph.* (*coarctata*, Z.) 16-20 mm. Forewings narrow, whitish, mixed with brownish and sprinkled with black; base darker; lines whitish, dark-edged, first oblique, second sinuate; orbicular outlined with black; claviform black, touching first line; a black X-shaped discal mark, upper half filled with light brownish; subterminal line cloudy, whitish, hardly touching second. Hindwings whitish-grey, terminally obscurely darker.

Britain to the Shetlands, Ireland, local; S. Europe, Asia Minor, N. Africa; 8-5. Larva blackish-grey, slightly greenish-tinged; spots darker or almost black; head pale brown; plate of 2 dark brown or almost black: on mosses, growing on walls; 6-9.

4. **S. alpina**, *Stt.* (*gracilalis*, Stt.) 19-23 mm. Forewings narrow, light brownish-ochreous or brownish, mixed with whitish and sprinkled with black; lines obscurely whitish, edged with indistinct blackish dots, first oblique, second sinuate; orbicular outlined with black; claviform black; a black X-shaped discal mark, filled with ground-colour; subterminal line obscurely whitish, sometimes touching second. Hindwings light fuscous; an indistinct darker discal dot.

Perth to the Shetlands, common above 3000 feet; Norway; 7.

5. **S. murana**, *Curt.* 16-22 mm. Forewings pale grey, much mixed with white and irrorated with black; some blackish marks towards base; lines white, internally blackish-edged, first oblique, second sinuate; orbicular outlined with black;

claviform blackish, oval, separate; a black-outlined 8-shaped discal mark; subterminal line cloudy, whitish, touching second in middle. Hindwings whitish-grey, in ♀ somewhat darker.

Devon, Dorset, Stafford to Sutherland, N. Ireland, local; N. and mountains of C. Europe; 6, 7. Larva dull brown, paler laterally; spots dark fuscous; head and plate of 2 dark brown or black: on mosses, growing on walls; 5, 6.

6. **S. frequentella,** *Stt.* (*phaeoleuca,* Stt., non Z.; ? *mercurella,* L.) 15-18 mm. Forewings grey, sometimes ochreous-tinged, mixed with black and partially suffused with white; base black-marked; lines white, dark-edged, first curved, followed by a suffused dark fascia, second rather sinuate; orbicular and claviform dot-like, black, often absorbed in the dark fascia; a black X-shaped discal mark, upper half sometimes filled with brownish; subterminal line cloudy, whitish, touching second in middle. Hindwings light grey, darker terminally. A variety with the first line enlarged into a broad white subbasal band is common at Portland.

England, Kirkcudbright, Ireland, common; C. and S. Europe; 7. Larva pale dull yellowish; dorsal line faintly brownish; spots brown; head dark brown; plate of 2 dark brown or almost black: on mosses, growing on walls, etc.; 3, 4.

7. **S. crataegella,** *Hb.* 15-17 mm. Forewings whitish, sometimes mixed with light ochreous-yellowish, sprinkled with black; base black-marked; lines whitish, blackish-edged, first irregular, second rather sinuate; orbicular and claviform dot-like, black; a black X-shaped discal mark; terminal area grey mixed with black, subterminal line white, interrupted in middle. Hindwings whitish-grey, darker terminally.

Britain to the Clyde, N. and E. Ireland, common; C. and S. Europe; 7. Larva yellowish-green; spots brownish-green; head and plate of 2 black-brown: on mosses; 3, 4.

8. **S. truncicolella,** *Stt.* (*mercurella,* Z.) 19-21 mm. Forewings ochreous-whitish, much sprinkled with black; base blackish-marked; lines whitish, dark-edged, first irregular, second angulate-sinuate, subserrate; orbicular and claviform dot-like or rather elongate, black; discal spot 8-shaped, outlined with black; subterminal line whitish, touching second in middle. Hindwings whitish-grey, darker terminally.

Britain to Caledonian Canal, Ireland, local; C. Europe; 7, 8. Larva dull dark brown; dorsal line blackish; spots black;

head dark brown; plate of 2 almost black: on mosses, growing on ground; 9-6.

9. **S. pallida**, *Stph.* 16-18 mm. Forewings light brownish-ochreous or brownish, mixed with whitish, and somewhat sprinkled with dark brown; lines white, first nearly obsolete, second slightly sinuate; orbicular, claviform, and discal spot dot-like or somewhat elongate, dark brown or blackish; subterminal line obscurely whitish, not touching second. Hindwings whitish, termen greyish-tinged.

Britain to the Orkneys, in marshy places, local; Germany; 7.

10. **S. cembrae**, *Hw.* (*Zelleri*, Knaggs, non Wk.; *scotica*, White) 20-25 mm. Forewings brown-grey, mixed or suffused with whitish, sometimes with a few black scales; a short black dash from base of costa; lines whitish, dark-edged internally, first curved, second angularly bent above middle; orbicular indistinctly outlined with blackish, touching first line; claviform indistinct, blackish, touching first line; a blackish X-shaped discal mark, upper half filled with brownish: subterminal line very cloudy, whitish. Hindwings whitish-grey.

Britain to the Clyde, E. Ireland, rather common; C. Europe; 6, 7. Larva whitish; dorsal line blackish; spots large, ochreous-tinged; head brown; plate of 2 pale brownish: in a slight web beneath ground on roots of *Picris* and *Tussilago*; 9-5.

11. **S. dubitalis**, *Hb.* (*pyralella*, Hb.; *ingratella*, Knaggs, non Z.) 16-19 mm. Forewings white, more or less sprinkled with dark fuscous; a black ochreous-mixed mark from base of costa; lines white, dark-edged, first rather irregular, second slightly angulate-sinuate above middle; round orbicular, and narrow oval claviform yellow-ochreous, edged with dark fuscous, resting on first line; discal spot large, 8-shaped, yellow-ochreous, dark-margined, touching costa above, and second line beneath; terminal area dark fuscous, subterminal line white, irregular. Hindwings ochreous-whitish, terminally suffused with grey.

Britain to Caledonian Canal, Ireland, common; C. Europe; 6. Larva on mosses; 3, 4.

12. **S. ambigualis**, *Tr.* (*atomalis*, Dbld.; *ulmella*, Knaggs; *conspicualis*, Hodgk.; *basistrigalis*, Knaggs) 17-22 mm. Forewings whitish, more or less sprinkled with grey and black; a black ochreous-mixed mark from base of costa; lines whitish, dark-edged, first irregular, second angulated above middle; orbicular elongate, brownish, more or less black-edged, resting

on first line; claviform dot-like, black, seldom elongated to touch first line; discal spot 8-shaped, incompletely black-edged, upper and sometimes lower half pale greyish-ochreous or brownish; terminal area dark, subterminal line cloudy, whitish; a terminal series of blackish marks. Hindwings prismatic grey-whitish, terminally suffused with grey.

Britain to the Shetlands, Ireland, abundant; C. and S. Europe, Asia Minor; 5-7. Larva on mosses growing on trees; 3, 4.

24. EVERGESTIS, *Hb.*

Antennae $\frac{2}{3}$. Labial palpi porrected, second joint rough-scaled, terminal rather short, loosely scaled, somewhat pointed. Maxillary palpi as long as second joint of labial, filiform. Tibial outer spurs $\frac{1}{2}$-$\frac{3}{4}$.

A genus of moderate size, principally inhabiting S. Europe and C. Asia. The labial palpi are shorter and the maxillary relatively longer than usual, so that they are more nearly equal than in any allied genus.

Lines of forewings dark fuscous . . 1. *straminalis.*
,, ,, hardly darker, dotted . 2. *extimalis.*

1. **E. straminalis**, *Hb.* (*stramentalis*, Hb.) 22-27 mm. Forewings pale ochreous-yellow, sprinkled with dark brown, veins posteriorly dark brown; lines dark fuscous, first angulated above middle, angularly indented above angle, second unevenly curved; an angularly 8-shaped discal spot outlined with dark fuscous, touching angle of first line; a cloudy dark fuscous subterminal line, forming above middle a strong dark suffusion enclosing a pale terminal spot. Hindwings prismatic yellow-whitish; traces of a dark posterior line; termen narrowly dark fuscous.

Kent to Hereford and Norfolk, Ireland, local; C. Europe, N. America; 7, 8. Larva dull dark green, becoming finally purple; subdorsal and lateral series of white dots; spiracular line bright yellow; subspiracular pale yellowish or whitish; spots black; head and sides of plate on 2 black: on *Barbarea*, *Sinapis*, and *Cardamine*; 8, 9.

2. **E. extimalis**, *Sc.* (*margaritalis*, Schiff.) 25-29 mm. Forewings pale ochreous-yellow, darker terminally; lines and discal spot hardly darker, marked with a few fuscous dots; a brown terminal suffusion, more or less strongly dilated towards middle; cilia fuscous. Hindwings prismatic yellow-whitish; termen yellower, brownish-tinged.

Kent to Gloucester and Norfolk, local; C. and S. Europe, N. Asia; 7. Larva pale yellow; dorsal line darker; lateral pale purple; spots on lateral line black; head black: on seeds of *Sinapis*; 8.

25. MESOGRAPHE, *Hb.*

Antennae $\frac{2}{3}$. Labial palpi porrected, second joint with dense projecting scales attenuated to a point forwards, terminal concealed. Maxillary palpi triangularly dilated with loose spreading scales. Tibial outer spurs $\frac{1}{2}$.

With the single European species (correlated with the preceding genus) one or two African forms are doubtfully congeneric.

1. **M. forficalis**, *L.* 25-29 mm. Forewings whitish-ochreous, disc and apex sometimes tinged with yellowish-brown; lines fine, dark brown, very obliquely curved, indented beneath costa, first very indistinct towards costa; two small transversely placed discal spots outlined with dark fuscous, lower larger; a dark fuscous oblique apical streak; margins of subterminal line obscurely brownish. Hindwings ochreous-whitish; a grey posterior line.

Britain to Ross, Ireland, common in gardens; C. Europe, WC. Asia to N. Persia; 5-8. Larva yellowish-green; dorsal and lateral lines darker green; head yellowish: on *Brassica*, *Raphanus*, etc.; 6, 7, 9, 10.

5. PYRALIDIDAE.

Ocelli and maxillary palpi usually developed. Forewings: 1b usually shortly furcate, 4 and 5 closely approximated or often stalked, 7 out of 9. Hindwings without defined pecten of hairs on lower margin of cell, 4 and 5 closely approximated or stalked, 7 out of 6 near origin, free or sometimes anastomosing with 8.

A family of moderate extent, fairly numerous within the tropics, but rather poorly represented elsewhere, absent from New Zealand. Imago with forewings elongate-triangular, costa often somewhat sinuate. The natural flight is towards evening, or sometimes in the sunshine.

Ovum more or less oval, surface granulated. Larva rather slender, with few hairs; feeding usually on dry or decaying vegetable substances. Pupa in a cocoon above ground.

The phylogeny of the few British genera is simple, the first three being all correlative developments of *Synaphe*.

Tabulation of Genera.

1 Hindwings with vein 8 anastomosing strongly with 7 . . . 1. ENDOTRICHA.
„ „ vein 8 free or anastomosing extremely shortly . . . 2.
2. Antennae in ♂ ciliated . . . 2. PYRALIS.
„ „ bipectinated . . . 3.
3. Tongue obsolete . . . 3. AGLOSSA.
„ well-developed . . . 4. SYNAPHE.

1. ENDOTRICHA, *Z.*

Antennae in ♂ fasciculate-ciliated. Labial palpi ascending, second joint with projecting scales beneath, terminal short, exposed. Maxillary palpi very short. Thorax in ♂ with patagia much elongated, terminating in long tuft. Forewings: 4 and 5 connate or stalked. Hindwings: 4 and 5 connate or stalked, 7 anastomosing strongly with 8.

An Indo-Malayan genus of moderate size, extending into Africa and Australia; one species alone reaches Europe.

1. **E. flammealis**, *Schiff.* 17-20 mm. Forewings ochreous-yellow, on basal area and posteriorly suffused with reddish-purple and sprinkled with blackish; several whitish semiannular costal marks; lines obscurely whitish, first curved, second slightly sinuate, running to tornus; a blackish discal spot; cilia with an ochreous-white subapical patch. Hindwings reddish-purple, sprinkled with blackish; a straight median yellowish fascia, striated with purplish.

S. England to Denbigh and Derby, W. Ireland, local; C. and S. Europe, WC. Asia to N. Persia; 6, 7. Larva dark purplish-brown; head dark brown; plate of 2 blackish: on decaying fallen leaves of hazel, *Salix*, *Lotus*, etc.; 8-5.

2. PYRALIS, *L.*

Ocelli often concealed. Antennae in ♂ ciliated. Labial palpi porrected or ascending, second joint sometimes rough-scaled, terminal exposed. Maxillary palpi with apex somewhat dilated. Forewings: 4 and 5 connate or stalked. Hindwings: 4 and 5 connate or stalked, 7 shortly approximated to 8.

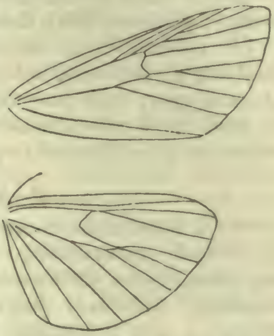
Not a large group, but cosmopolitan; though some species owe their wide range to artificial introduction.

1. Cilia yellow . . . . . 2 *costalis.*
„ not yellow . . . . . 2.

2. Second line of forewings nearly straight . 1. *glaucinalis.*
„ „ „ much curved . . 3.
3. Lines of forewings forming triangular costal spots
4. *lienigialis.*
„ „ not forming costal spots 3. *farinalis.*

1. **P. glaucinalis,** *L.* 21-29 mm. Forewings brownish-grey, on costa purplish; median part of costa dotted with yellow; lines pale ochreous, nearly straight, stronger and yellower on costa. Hindwings grey; two fine whitish approximated lines, first twice subangulated, second curved.

England to York, E. Ireland, rather local; C. Europe, C. Asia, Japan; 6, 7. Larva blackish-green, lighter laterally; head and plate of 2 lighter: in silken galleries amongst decaying leaves and twigs of birch; 3-5.


Neuration of *Pyralis farinalis.*

2. **P. costalis,** *F.* (*fimbrialis,* Schiff.) 17-20 mm. Forewings purple, sometimes blackish-sprinkled; median part of costa dotted with yellow; lines yellow, nearly straight, forming large spots on costa; a terminal line and cilia yellow. Hindwings as forewings, but lines much nearer together, irregularly curved, not forming costal spots.

England to York, local; C. and S. Europe, WC. and N. Asia, N. Africa, N. America; 7, 8.

3. **P. farinalis,** *L.* 20-28 mm. Forewings purple-brown, towards apex more reddish-brown; median band more or less wholly suffused with pale or sometimes deep ochreous, especially towards costa; median part of costa dotted with white; lines whitish, first obtusely angulated, second with middle third strongly curved outwards, thicker towards costa. Hindwings dark grey mixed with whitish, especially before termen; lines whitish, as in forewings, but much more approximated, especially on lower half.

Britain to Caledonian Canal, Ireland, common; Europe, N. and C. Asia, Japan, N. Africa, N. America, Australia, New Zealand (probably Central Asiatic in origin, elsewhere introduced but now fully established); 6-8. Larva ochreous-whitish, towards extremities dusky-tinged; dorsal line darker; head reddish-brown; plate of 2 yellowish-brown: in silken galleries amongst flour and corn-refuse; 9-5 (said to live two years).

4. **P. lienigialis**, *Z.* 20-24 mm. Differs from *P. farinalis* as follows: lines of forewings more slender, forming well-marked triangular costal spots, first hardly curved, second with central curve wider, hindwings darker grey, not whitish-mixed, lines much more slender and indistinct.

Bucks (Stoney Stratford), local, perhaps sometimes overlooked; Finland, NW. Russia; 8, 9.

(*P. pictalis*, Curt., an Indo-Malayan species somewhat resembling *P. farinalis*, but smaller, with basal area conspicuously blackish-grey, first line straight, second little curved, is said to have been taken once in London, but the specimen was doubtless an accidental importation.

3. AGLOSSA, *Latr.*

Ocelli sometimes concealed. Tongue obsolete. Antennae in ♂ finely bipectinated. Labial palpi porrected or subascending, second joint with dense projecting scales beneath, terminal exposed. Maxillary palpi with apex loosely scaled. Forewings: 4 and 5 connate or stalked. Hindwings: 4 and 5 stalked, 7 shortly approximated to 8.

A genus of very few species, now so widely spread by human agency that their origin is uncertain.

Hindwings grey . . . . 1. *pinguinalis.*
„ fuscous-whitish . . 2. *cuprealis.*

1. **A. pinguinalis**, *L.* 28-36 mm. Forewings greyish-ochreous or brownish, densely sprinkled with dark fuscous; a blackish subbasal line; first and second lines obscurely paler, rather broad, waved, cloudily edged with dark fuscous on both sides, second curved outwards in disc; a dark fuscous discal spot. Hindwings fuscous-grey; a paler postmedian line very obscurely indicated.

Britain to Perth, Ireland, common in stables; Europe, N. and C. Asia, N. Africa, Australia (doubtless introduced); 6, 7. Larva blackish or dark brown; head blackish: in silken galleries amongst chaff and hay-refuse; 8-5.

2. **A cuprealis**, *Hb.* 21-25 mm. Forewings rather dark fuscous, irregularly mixed with whitish-ochreous, reddish-tinged throughout; lines whitish-ochreous, reddish-tinged, serrate, first oblique, second strongly curved outwards in disc. Hindwings fuscous-whitish; terminal line and one in cilia dark fuscous.

England to York, Roxburgh, local; S. Europe, C. Asia, N. Africa, N. America, Australia (range due to accidental introduction); 7. Larva bronzy-blackish; head and plate of 2 deep brown-red: in silken galleries amongst chaff, maize, etc.; 8-5.

4. SYNAPHE, *Hb.*

Antennae in ♂ finely bipectinated. Labial palpi very long, porrected, loosely scaled, attenuated forwards, terminal joint long, exposed. Maxillary palpi triangularly dilated. Hindwings: 4 and 5 connate or stalked, 7 shortly approximated to 8 or connected at a point only.

A moderate genus, mainly characteristic of S. Europe, C. Asia, and N. Africa.

1. **S. angustalis**, *Schiff.* 20-25 mm. Forewings ochreous-brown or ochreous-yellowish, more or less sprinkled with dull reddish-purple, sometimes suffused with reddish-brown; several white costal dots; first line hardly paler, faint, posteriorly darker-edged, curved; second thick, cloudy, pale ochreous, slightly sinuate, anteriorly darker-edged; a darker discal dot, often indistinct. Hindwings rather dark grey.

S. England to Norfolk and Somerset, York, local; C. and S. Europe; 6-8. Larva dusky reddish-brown or blackish; head black; plate of 2 dark reddish-brown: in slight web amongst damp moss, growing on ground; 5, 6.

6. PTEROPHORIDAE.

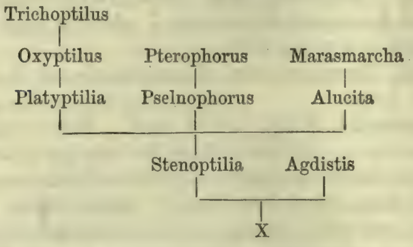
Ocelli usually concealed or obsolete, rarely distinct. Tongue developed. Maxillary palpi obsolete. Antennae in ♂ shortly ciliated. Forewings: 1b simple or shortly furcate, 1c present, 5 remote from 4, 8 and 9 stalked or coincident or rarely separate (*Agdistis*), wing usually fissured to form two segments. Hindwings without defined pecten of hairs on lower margin of cell, on lower surface with a double row of short spine-like scales on lower margin of cell in disc; 1a usually obsolete, 5 remote from 4, 7 remote from 6, shortly approximated to 8 beyond origin, wing usually fissured to form three segments.

Although this family is universally distributed and includes altogether a very considerable number of species, it is nowhere very prominent. Imago with forewings very elongate, narrow, dilated posteriorly. Most of the species fly about sunset. The legs are very long and unusually slender; the outer tibial spurs are almost as long as the inner, except in *Agdistis* and some species of *Alucita*. In the genera with cleft wings veins 5 and 6 are necessarily extremely short, but always present.

Ovum more or less oval, smooth. Larva rather short, with more or less developed fascicles of hairs. Pupa sometimes hairy, attached by tail or in a slight cocoon above ground.

The phylogeny is expressed in the diagram.

Phylogeny of Pterophoridae.



Tabulation of Genera.

1.	Wings entire	9. Agdistis.
	„ fissured	2.
2.	Hindwings with black scale-tooth in dorsal cilia	3.
	„ without black scale-tooth	5.
3.	Forewings with 7 and 9 absent	1. Trichoptilus.
	„ „ 7 and 9 present	4.
4.	Forewings with 10 out of 8	2. Oxyptilus.
	, „ 10 separate	3. Platyptilia.
5.	Forewings with all veins present	8. Stenoptilia.
	„ „ one or more veins absent	6.
6.	Forewings with 10 separate	7. Alucita.
	„ „ 10 out of 8 or absent	7.
7.	Forewings with 3 and 7 absent	4. Pterophorus.
	„ „ 3 and 7 present	8.
8.	Forewings with 11 out of 8	5. Pselnophorus.
	„ „ 11 separate	6. Marasmarcha.

1. TRICHOPTILUS, *Wlsm.*

Face not tufted. Labial palpi ascending, second joint with short projecting scales beneath, tending to form a short angular apical tuft, terminal filiform. Tibiae thickened with scales on origin of spurs. Forewings cleft from before middle, segments linear: 2 out of 4 or absent, 3 absent, 7 and 9 absent, 10 from near 8 or absent, 11 from near 8. Hindwings trifid, segments linear, 3rd segment with slight black scale-tooth in dorsal cilia; 3 absent.

A small but nearly cosmopolitan genus, containing only two European species.

1. **T. paludum,** *Z.* 12-13 mm. Forewings light brown, sometimes tinged with yellowish or reddish; a black subcostal subbasal dot; sometimes a dark fuscous dorsal spot towards base; sometimes a whitish spot before fissure; two slender white bars on segments; all cilia with patches of black scales, costal and dorsal with white bars. Hindwings dark fuscous.

Surrey to Dorset, Cambridge, York, in swampy places, local; C. Europe; 6, 8.

2. OXYPTILUS, *Z.*

Face smooth or shortly tufted. Labial palpi ascending, second joint with appressed or projecting scales beneath, sometimes forming a short angular apical tuft, terminal filiform. Tibiae thickened with scales on origin of spurs. Forewings cleft from about middle; 2 connate with 4, 3 out of 4, 9 and 10 out of 8, 11 from near 8. Hindwings trifid, third segment with strong black scale-tooth in dorsal cilia.

Specially characteristic of Europe, whence stragglers have spread into other regions.

1. Forewings brownish-ochreous; scale-tooth at $\frac{2}{3}$ . . . 1. *distans.*
   ,, dark reddish-fuscous; scale-tooth near apex . . . . 2.
2. Hindwings with two posterior dorsal scale-teeth . . . 5. *teucrii.*
   ,, with one posterior dorsal scale-tooth . 3.
3. Dorsal scale-tooth subapical . . 2. *pilosellae.*
   ,, apical . . . . 4.
4. Forewings white-sprinkled; bars of cilia white . . . 3. *parvidactylus.*
   ,, not white-sprinkled; bars of cilia reddish-tinged . . 4. *hieracii.*

1. **O. distans,** *Z.* (*laetus,* Z.) 18-20 mm. Forewings light brownish-ochreous, more or less suffused with fuscous; two obscure whitish bars on segments; cilia with a few black scales, costal and dorsal with whitish bars. Hindwings dark grey; dorsal scale-tooth at $\frac{2}{3}$, small.

Kent to Devon and Norfolk, on sandhills, local; C. and S. Europe, WC. Asia to Turkestan; 6-8. Larva probably on flowers of *Hieracium* (abroad on *Andryala*); 7, 9.

2. **O. pilosellae**, *Z.* 16-18 mm. Forewings dark reddish-fuscous; two ill-defined whitish bars on segments; cilia mixed with black scales, costal and dorsal with pale ochreous-reddish bars. Hindwings dark fuscous, third segment dark reddish-fuscous, with apical patch of black scales in upper cilia, dorsal scale-tooth black, moderate, subapical.

Kent to Dorset, Cambridge, local; N. and C. Europe, WC. Asia to N. Persia; 7, 8. Larva on *Hieracium pilosella;* 6.

3. **O. parvidactylus**, *Hw.* 14-16 mm. Forewings dark reddish-fuscous, somewhat white-sprinkled; two distinct white bars on segments; cilia with patches of black scales, costal and dorsal barred with white. Hindwings dark fuscous, third segment dark reddish-fuscous, with apical patch of black scales in upper cilia and whitish spot in apical cilia, dorsal scale-tooth large, black, apical.

England, N. Ireland, local; Europe, WC. Asia to N. Persia; 6, 7. Larva on *Hieracium pilosella* (?); 9-5.

4. **O. hieracii**, *Z.* 17-20 mm. Forewings dark reddish-fuscous; two distinct white bars on segments; cilia with patches of black scales, costal and dorsal with reddish-whitish bars. Hindwings dark fuscous, third segment dark reddish-fuscous, with apical patch of purple-blackish scales in upper cilia and reddish-whitish spot in apical cilia, dorsal scale-tooth large, purple-blackish, apical.

England, very local and scarce; C. Europe, Asia Minor; 7, 8. Larva on *Hieracium umbellatum;* 6.

5. **O. teucrii**, *Greening* (*heterodactylus*, Hw., non Vill.) 19-21 mm. Forewings dark reddish-fuscous, with a few white scales; indistinct whitish spots at $\frac{1}{3}$ of disc, and base of first segment; two well-marked white bars on segments; cilia mixed with black scales, barred with whitish. Hindwings dark fuscous, third segment with two subapical black scale-teeth in upper cilia, suboblong subapical and small apical scale-teeth in dorsal cilia, separated by whitish spots.

England, local; Germany; 6, 7. Larva pale greyish-green; dorsal and subdorsal lines darker green; spots brown, hairs numerous, whitish: on *Teucrium scorodonia;* 9-5.

3. PLATYPTILIA, *Hb.*

Face tufted. Labial palpi subascending, second joint loosely scaled, terminal filiform. Tibiae simple or somewhat tufted on centre of middle tibiae and origin of spurs. Forewings cleft from $\frac{2}{3}$-$\frac{3}{4}$; 8 and 9 stalked, 11 remote. Hindwings trifid, third segment with strong black scale-tooth in dorsal cilia.

A considerable genus, quite cosmopolitan; a development of *Stenoptilia*.

1. Scale-tooth of hindwings in middle of dorsum . 2.
,, ,, much beyond middle 6.
2. Palpi and frontal tuft very long . . . 3.
,, ,, moderate . . . 4.
3. Posterior tibiae below middle-spurs wholly brown
6. *Bertrami*.
,, ,, with white band
7. *ochrodactyla*.
4. Costal triangular spot sharply defined . . 5.
,, ,, very ill-defined . 5. *isodactyla*.
5. Apex of forewings appearing subfalcate . 3. *gonodactyla*.
,, ,, hardly sinuate. 4. *Zetterstedtii*.
6. Hindwings with postmedian and small apical scale-teeth . . . . 7.
,, with large apical scale-tooth only
8. *rhododactyla*.
7. Forewings reddish-fuscous . 2. *acanthodactyla*.
,, pale greyish-ochreous marked with black
1. *cosmodactyla*.

1. **P. cosmodactyla**, *Hb.* (*punctidactyla*, Hw.) 18-21 mm. Forewings pale greyish-ochreous closely striated with black; a triangular black blotch on costa beyond middle, followed by a small white costal spot; a black subterminal bar on segments, posteriorly finely whitish-edged; apical $\frac{2}{3}$ of terminal cilia white. Hindwings blackish; scale-tooth very large, much beyond middle, edged by whitish spaces; a small black apical scale-tooth.

England, Argyll, S. Ireland, local; N. and C. Europe; 7, 9-5. Larva from pale green to purplish-pink; dorsal line dark grey; subdorsal white, conspicuous; lateral and spiracular whitish, interrupted; head dark reddish-fuscous, almost black: on *Stachys*, *Aquilegia*, *Geranium*, etc.; 6, 8.

2. **P. acanthodactyla**, *Hb.* 18-21 mm. Forewings reddish-fuscous, costa marked with dark fuscous, sometimes white-dotted; a dark fuscous triangular blotch on costa beyond middle, usually followed by a white costal dash; a dark fuscous subterminal bar on segments, posteriorly white-edged; apical $\frac{2}{3}$

of terminal cilia white. Hindwings dark fuscous; scale-tooth moderate, beyond middle; a small black apical scale-tooth.

Britain to Ross, S. Ireland, common, less frequent northwards; Europe, Asia Minor, N. America (?); 7, 9-5. Larva from pale green to deep purple; dorsal line dark grey; subdorsal, lateral, and sometimes spiracular whitish, interrupted; head yellowish-grey or yellowish-brown, blackish-marked: on *Stachys*, *Ononis*, *Geranium*, etc.; 6, 8.

3. **P. gonodactyla**, *Schiff.* (*trigonodactylus*, Stt.) 20-26 mm. Forewings with termen markedly sinuate, light brown, suffusedly strigulated with white; costa dark brown, white-dotted; a dark reddish-fuscous posteriorly whitish-edged triangular blotch on costa beyond middle; a whitish subterminal line across both segments; apical ⅔ of terminal cilia white. Hindwings dark fuscous; scale-tooth moderate, in middle.

Britain to the Orkneys, Ireland, common; N. and C. Europe; 6, 9. Larva green, grey, or whitish; dorsal and subdorsal lines dark red, sometimes very faint or obsolete, sometimes suffused: in flower-heads and on leaves of *Tussilago farfara;* 4, 5, 7, 8.

4. **P. Zetterstedtii**, *Z.* (*taeniadactyla*, South) 19-22 mm. Differs from *P. gonodactyla* as follows: forewings with termen distinctly less sinuate, apical spot in cilia lighter and apex appearing less falcate, colour rather darker and more ochreous-tinged, less strigulated with white, especially posteriorly.

Devon, Cornwall, local; N. and C. Europe; 6, 7. Larva in stems of *Senecio* and *Solidago;* 8, 9.

5. **P. isodactyla**, *Z.* 21-23 mm. Forewings brown; costa anteriorly dark fuscous, whitish-sprinkled; a very ill-defined dark fuscous triangular blotch on costa beyond middle, apex forming a distinct dot; faint traces of a pale subterminal line; apical ⅔ of terminal cilia white. Hindwings dark fuscous; scale-tooth moderate, in middle.

Dorset and Devon to Pembroke, Suffolk, Norfolk, Ireland, local; C. Europe; 6, 8, 9. Larva pale green; dorsal line darker; subdorsal darker, whitish-edged above; lateral and spiracular faintly whitish; head and tubercles black: in stems of *Senecio aquaticus;* 5, 7, 8.

6. **P. Bertrami**, *Rsl.* 23-27 mm. Frontal tuft and palpi very long Posterior tibiae below middle-spurs wholly light brown. Forewings with apex subfalcate, ferruginous-ochreous, clouded with yellow-whitish; costal edge dark fuscous; a darker triangular suffusion on costa beyond middle apex

forming a darker dot, and followed by a whitish costal spot; an ochreous-whitish subterminal line; apical $\frac{2}{3}$ of terminal cilia white. Hindwings dark ochreous-fuscous; scale-tooth small, in middle.

England, E. Ireland, rather common; C. Europe, N. America; 7. Larva green; dorsal line darker or somewhat brownish-tinged; subdorsal and lateral grey-whitish; subspiracular white; head whitish-yellowish: in shoots of *Achillea*; 5, 6.

7. **P. ochrodactyla**, *Hb.* (*dichrodactylus*, Mühl.) 23-27 mm. Differs from *P. Bertrami* as follows: posterior tibiae with a whitish band below middle-spurs; forewings with apex more falcate, more distinctly marked, apex of triangular suffusion forming a distinct blackish dot; scale-tooth of hindwings somewhat larger.

England, local; C. Europe; 7. Larva green; dorsal line dark brown; subdorsal and lateral grey or whitish-grey; subspiracular grey-whitish; head and plate of 2 pale yellowish: in stems of *Tanacetum vulgare*; 9-6.

8. **P. rhododactyla**, *F.* 17-23 mm. Forewings red-brown, costa whitish-sprinkled; two oblique white fasciae, first before middle, sometimes interrupted, second before fissure; a darker suffusion towards costa between these; cilia white towards middle of termen of each segment. Hindwings reddish-fuscous; third segment with middle third whitish, apical dark reddish-fuscous; scale-tooth large, almost apical.

Kent, Middlesex, local; C. and S. Europe, Asia Minor; 7, 8. Larva greenish-yellow or green; dorsal line purple, broader anteriorly; subdorsal and spiracular faintly yellow; head grey: on flower-buds and shoots of rose; 5, 6.

4. PTEROPHORUS, *Geoffr.*

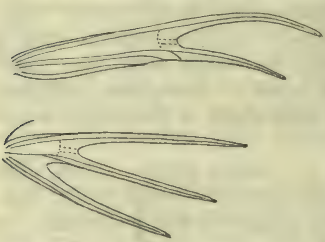
Face not tufted. Labial palpi subascending, second joint sometimes loosely scaled, terminal acute. Tibiae simple. Forewings cleft from about middle; 2 sometimes out of 4 or absent, 3 absent, 7, 9, and 10 absent, 11 connate with or out of 8 or absent. Hindwings trifid, third segment without black scales in dorsal cilia; 3 absent.

A genus of some extent, nearly cosmopolitan, but no endemic species occurs in Australia, though in New Zealand there are several.

1. Forewings with blackish mark before fissure . 2.
„ without such mark . . . 3.

2. Forewings with black discal dot at $\frac{1}{3}$ 4. *galactodactylus.*
,, without discal dot at $\frac{1}{3}$ 5. *spilodactylus.*
3. Costal cilia of forewings wholly white 3. *pentadactylus.*
,, ,, not wholly white . 4.
4. Costal cilia of forewings wholly dark fuscous 1. *tetradactylus.*
,, ,, not wholly dark fuscous 2. *baliodactylus.*

1. **P. tetradactylus,** *L.* 16-22 mm. Forewings yellow-whitish; costa more or less broadly suffused with fuscous, posteriorly becoming a very slender dark fuscous costal streak; sometimes a subcostal whitish line towards base; costal cilia wholly dark fuscous, rest fuscous. Hindwings dark grey, segments whitish towards tips.


Neuration of *Pterophorus spilodactylus.*

Britain to Caledonian Canal, W. Ireland, rather common; Europe, Asia Minor; 6-8. Larva green; dorsal line broad, darker, whitish-edged; subdorsal darker; spiracular grey-yellowish; head yellowish-green: on *Thymus;* 5, 6.

2. **P. baliodactylus,** *Z.* 19-25 mm. Forewings whitish-ochreous or pale yellowish-ochreous; a dark fuscous mark in costal cilia beyond middle, costal edge from base to this very finely dark fuscous mixed with whitish; a fuscous costal suffusion from near this to near apex; cilia towards tips of both segments becoming yellow-whitish above, dark grey beneath. Hindwings grey, paler and ochreous-tinged towards tips of segments.

S. England to Gloucester and Oxford; C. and S. Europe, Asia Minor; 7, 8. Larva dull green; dorsal line and incisions more yellowish; head yellowish-green: on *Origanum;* 6.

3. **P. pentadactylus,** *L.* 26-29 mm. Forewings and hindwings wholly white, with a few blackish scales.

England, E. and S. Ireland, common; Europe, N. and WC. Asia; 6, 7. Larva green; dorsal area yellow, enclosing a series of green blotches; spiracular whitish posteriorly; head yellow-brown: on *Convolvulus;* 8-5.

4. **P. galactodactylus,** *Hb.* 20-25 mm. Forewings yellowish-white, with a few blackish scales; a blackish dot in disc at $\frac{1}{3}$, two transversely placed before fissure, one on costa at $\frac{3}{4}$, two

on dorsum posteriorly, and often one beneath apex of first segment; cilia with dark grey spots on costa and dorsum beyond middle, and at apex of segments. Hindwings grey or whitish-grey, more whitish posteriorly.

S. England to Hereford and Norfolk, Lancashire, E. Ireland, rather common; C. Europe, WC. Asia to N. Persia; 7. Larva pale green; dorsal line double, whitish: on *Arctium lappa*; 5.

5. **P. spilodactylus,** *Curt.* (*? migadactyla*, Hw.) 20-25 mm. Forewings ochreous-white; a fuscous or greyish-ochreous basal blotch, more extended along costa; an oblique dark fuscous sometimes interrupted fascia before fissure; cilia with a dark grey blotch on middle of upper margin, and two on lower margin of both segments. Hindwings dark grey, third segment whitish towards base; cilia partly whitish-suffused.

I. of Wight, Dorset, Worcester, Suffolk, local; C. and S. Europe; 7, 8. Larva deep green, with minute black dots; sometimes a double dorsal series of oblique brownish marks; head yellowish-green: on *Marrubium vulgare*; 5-7

5. PSELNOPHORUS, *Wallgr.*

Face not tufted. Labial palpi ascending, loosely scaled, terminal joint pointed. Tibiae thickened with scales on origin of spurs. Forewings cleft from about middle; 2 and 3 out of 4, 7 absent, 9, 10, and 11 out of 8. Hindwings trifid, third segment without black scales in dorsal cilia; 3 absent.

Besides the following, there is one other Siberian species.

1. **P. brachydactylus,** *Tr.* 18-21 mm. Forewings dark fuscous; a dot or small spot before fissure, a small costal mark before middle, a fascia or suffused costal spot beyond fissure, a subapical spot in costal cilia, and two posterior spots in dorsal cilia white. Hindwings dark fuscous; cilia partly whitish-suffused.

Norfolk, Cumberland, Perth, very scarce; N. and C. Europe, WC. Asia to N. Persia; 7. Larva pale green; dorsal line darker; head yellow-brown: on *Lactuca muralis*; 5, 6.

6. MARASMARCHA, *Meyr.*

Face somewhat tufted. Labial palpi ascending, slender, terminal joint pointed. Tibiae simple. Forewings cleft from before $\frac{2}{3}$; 3 and 4 connate or stalked, 8 and 10 stalked, 9 absent. Hindwings trifid, third segment without black scales in dorsal cilia; 3 absent.

A small genus, extending into Africa and C. Asia.

Forewings dark ochreous-fuscous . 1. *phaeodactyla.*
„ whitish-yellowish . . 2. *microdactyla.*

1. **M. phaeodactyla,** *Hb.* 20-22 mm. Forewings dark ochreous-fuscous, in ♀ paler; often a small pale or whitish dorsal spot before middle; an inwards-angulated whitish-ochreous fascia on base of segments. Hindwings dark fuscous.

S. England to Hereford and Cambridge, York, locally common; C. and SE. Europe; 7. Larva green or whitish-green; dorsal line darker; tubercles black; head black-marked: on *Ononis;* 6.

2. **M. microdactyla,** *Hb.* 14-16 mm. Forewings whitish-yellowish, sprinkled with blackish; a dot in disc at $\frac{1}{3}$, a mark at base of fissure, a distinct mark on costa beyond fissure, a less distinct one towards apex, and some indistinct dots on margins of segments blackish. Hindwings grey.

England, rather common; N. and C. Europe, Asia Minor; 5, 6, 8. Larva with numerous rough points on back; flesh-colour; dorsal line slightly paler; head pale yellowish-brown: in stems of *Eupatorium cannabinum;* 7, 9, 10.

7. ALUCITA, *L.*

Face not tufted. Labial palpi ascending, loosely scaled, terminal joint obtuse or pointed. Tibiae sometimes thickened on origin of spurs and centre of middle tibiae. Forewings cleft from about $\frac{2}{3}$; 3 and 4 connate, 9 absent. Hindwings trifid, third segment without black scales in dorsal cilia; 3 absent.

Principally European and American, with stragglers in other regions.

1. Middle tibiae thickened with scales in middle 5. *lithodactyla.*
„ „ not thickened in middle . . 2.
2. Forewings with black marginal posterior dots . 3.
„ without black marginal dots . 1. *osteodactyla.*
3. Forewings with two dots at base of fissure 2. *tephradactyla.*
„ „ a single spot at base of fissure . 4.
4. A small irregular spot before fissure 4. *monodactyla.*
A strong oblique mark at base of fissure . 3. *lienigiana.*

1. **A. osteodactyla,** *Z.* 17-21 mm. Forewings whitish-yellowish, partly ochreous-tinged, often more or less mixed or suffused with light fuscous; a dark fuscous dot at base of fissure; a light fuscous suffusion towards costa posteriorly; cilia light grey, on costa whitish-yellow. Hindwings grey.

England, local; N. and C. Europe; 7. Larva pale brownish;

dorsal, subdorsal, and lateral lines darker brown: on flowers and seeds of *Solidago virgaurea*; 9-4.

2. **A. tephradactyla,** *Hb.* 20-22 mm. Forewings ochreous-whitish, irrorated with pale grey and blackish; a blackish dot in disc at $\frac{1}{3}$, two transversely placed at base of fissure, and two or three on margins of each segment towards apex; cilia grey, on costa whitish-ochreous towards apex. Hindwings grey; a darker dot at apex of each segment.

Britain to Sutherland, local; N. and C. Europe; 6. Larva green; dorsal line double, greyish; head pale yellowish: on *Solidago virgaurea*; 9-5.

3. **A. lienigiana,** *Z.* 18-19 mm. Forewings fuscous-whitish, irrorated with blackish; a small blackish spot in disc at $\frac{1}{3}$, an oblique spot at base of fissure, a mark on costa beyond fissure, a smaller one towards apex, and two or three dots at apex and on lower edge of each segment; cilia grey, on costa white, on costal marks blackish. Hindwings grey; a darker dot at apex of segments.

Kent to Devon and Norfolk, local; C. Europe; 7. Larva pale bluish-green; dorsal line broad, darker; subdorsal yellow-whitish; head brown, blackish-marked: on *Artemisia vulgaris*; 5, 6.

4. **A. monodactyla,** *L.* (*pterodactyla,* Hb.) 21-26 mm. Forewings from pale greyish-ochreous to pale reddish-brown, often whitish-mixed, sometimes with a few black scales; a black dot in disc before $\frac{1}{3}$, a small irregular spot before base of fissure, two dots on costa posteriorly, and two or three at apex and on lower edge of segments; cilia grey, on costa concolorous with wing. Hindwings grey.

Britain to the Orkneys, N. and E. Ireland, common; Europe, WC. Asia to Turkestan, N. Africa, N. America; 9-4. Larva green, marked with whitish, sometimes brownish-tinged; dorsal line uneven, dark green or red-brown; head pale brown, sometimes greenish-tinged: on *Convolvulus*; 6-8.

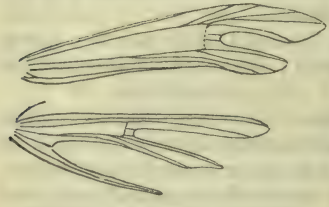
5. **A. lithodactyla,** *Tr.* 23-27 mm. Middle tibiae thickened with scales in middle and at apex. Forewings pale brown, irregularly mixed with grey-whitish and irrorated with black; a blackish subcrescentic posteriorly white-edged mark before fissure; an elongate blackish mark on costa near beyond it; some blackish marginal dots towards apex; cilia dark grey, somewhat whitish-mixed. Hindwings rather dark fuscous; a darker dot at apex of segments.

Britain to Roxburgh, W. Ireland, rather common; C. Europe;

7, 8. Larva green; dorsal line broad, rosy, purplish-edged: on *Inula* and *Pulicaria*; 5, 6.

8. STENOPTILIA, *Hb.*

Face with horny prominence. Ocelli sometimes distinct. Labial palpi porrected, second joint with loose rough or appressed scales, terminal filiform. Tibiae simple. Forewings cleft from about $\frac{2}{3}$; 8 and 9 stalked. Hindwings trifid, third segment without black scales in dorsal cilia.



Neuration of *Stenoptilia pterodactyla*.

A nearly cosmopolitan genus of some extent.

1. Cilia of hindwings distinctly reddish . 1. *pterodactyla*.
,, ,, not reddish . . . 2.
2. Outer half of costal cilia white . 2. *zophodactyla*.
,, ,, ,, ,, not white 3. *bipunctidactyla*.

1. **S. pterodactyla**, *L.* (*fuscus*, Retz.; *fuscodactylus*, Hw.) 21-24 mm. Forewings reddish-brown, lighter and more reddish dorsally, especially towards base, with a few blackish and whitish scales; extreme edge of costal cilia whitish; a blackish dot at base of fissure, and sometimes traces of a second above it; base of terminal cilia whitish dotted with black. Hindwings dark fuscous, reddish-tinged, third segment often lighter; cilia distinctly reddish.

Britain to Caledonian Canal, Ireland, common; Europe, Asia Minor, N. America; 7. Larva green or yellowish-green; dorsal line darker or brown; subdorsal and lateral indistinct, grey-whitish; head pale ochreous, reticulated with black: on *Veronica chamaedrys*; 5, 6.

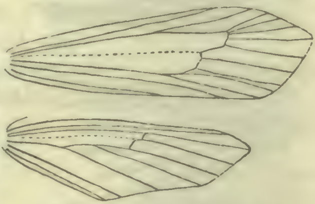
2. **S. zophodactyla**, *Dup.* (*Loewii*, Z.; *Hodgkinsoni*, Gregs.) 18-20 mm. Forewings fuscous-grey, somewhat whitish-sprinkled, with some black scales posteriorly; a blackish dot in disc at $\frac{1}{3}$, a second larger at base of fissure, and a third indistinct above and before second; outer half of costal cilia white; terminal cilia with an interrupted black subbasal line. Hindwings dark fuscous.

England to York, E. Ireland, local; C. and S. Europe, Asia Minor; 8, 9. Larva yellowish-green or brownish-yellow; dorsal line purple or reddish, sometimes darker green; subdorsal sometimes pale purplish or pale yellowish : on flowers of *Erythraea centaurium ;* 6. 7.

3. **S. bipunctidactyla**, *Hw.* (*aridus*, Z. ; *serotinus*, Z. ; *plagiodactylus*, Stt.) 18-23 mm. Forewings brown, more or less sprinkled with black and whitish ; a distinct clear ochreous dorsal streak, sometimes reddish-tinged ; a blackish dot in disc at ⅓, and a transverse spot at base of fissure ; base of terminal cilia whitish, with several black dots. Hindwings dark fuscous.

Britain to Ross, Ireland, common ; Europe, Asia Minor ; 6, 8. Larva green or pale greenish-yellow ; dorsal line rosy, reddish-fuscous, or brown, sometimes obsolete : on shoots and flowers of *Scabiosa ;* 5, 7. The variations of the imago tend to be localised, probably through correlation to the character of the food-plant.

9. AGDISTIS, *Hb.*



Neuration of *Agdistis Bennetii.*

Face with horny prominence. Ocelli distinct. Labial palpi ascending, second joint with projecting scales beneath, terminal short. Tibiae simple. Forewings entire ; 8 and 9 separate, 9 and 10 sometimes connate. Hindwings entire, dorsum with rough scales beneath ; 5 absent.

A small European genus, extending into Africa. Whilst agreeing with the rest of the family in essential structure, it yet differs most strikingly from all. It doubtless represents the ancestral type of the family, but only in a very modified form.

1. **A. Bennetii**, *Curt.* 22-25 mm. Forewings greyish-ochreous, towards costa and dorsum irrorated with blackish ; a blackish dot in disc at ⅓, two above dorsum before and beyond middle, a fourth above and beyond third, and a fifth below costa at ¾. Hindwings pale grey, darker dorsally ; termen above tornus sprinkled with blackish.

I. of Wight, Kent, Essex, York, local ; not yet identified elsewhere ; 7. Larva on *Statice limonium ;* 5.

7. ORNEODIDAE.

Ocelli distinct. Tongue developed. Maxillary palpi obsolete. Forewings six-cleft, cell very short, 5 absent, 7 separate, 8 and

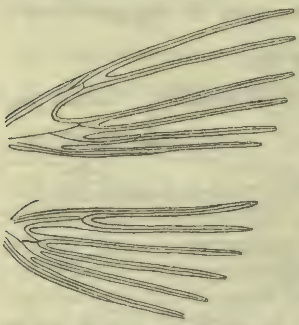
9 coincident. Hindwings six-cleft, cell very short, 5 absent, 7 out of 6 near origin, 8 free.

The curious genus which alone constitutes this family stands very isolated, the earlier connecting forms being apparently all extinct. Imago with forewings triangular, cleft almost from the base into six linear segments; flight crepuscular.

Larva moderately elongate, with few hairs. Pupa in a cocoon above ground.

1. ORNEODES, *Latr.*

Face with projection of scales. Antennae in ♂ minutely ciliated. Labial palpi long, obliquely ascending, second joint with projecting scales beneath, somewhat tufted, terminal pointed. Forewings: 5 and 6 absent, 9 and 10 absent.



Neuration of *Orneodes hexadactyla.*

A genus of about 20 known species, pretty evenly distributed throughout the world.

1. **O. hexadactyla,** *L.* (*polydactyla*, Hb.) 13-16 mm. Terminal joint of palpi as long as second. Forewings ochreous-grey; two costal spots before and one beyond middle, a median fascia projecting inwardly above and outwardly below middle, and narrow subterminal fascia dilated in middle blackish edged with whitish; apex of segments blackish; cilia grey, mixed with blackish and barred with whitish. Hindwings grey, barred throughout with blackish and whitish; cilia grey, with whitish bars forming four transverse lines.

Britain to Aberdeen, Ireland, common; Europe, Asia Minor; 8-4. Larva yellow; head brownish-ochreous: amongst flower-buds of *Lonicera;* 6, 7.

6. PSYCHINA.

Eyes glabrous. Maxillary palpi rudimentary or obsolete (yet sometimes well marked in pupa). Posterior tibiae with spurs very short (except *Heterogeneidae*), middle-spurs often absent. Forewings: 1b furcate, 1c usually developed, 5 more or less approximated to 4. Hindwings with frenulum, retinaculum often very broad, 1c present, 8 connected or anastomosing with cell (except *Zeuzeridae*).

This ancient group, which furnishes the origin of the five preceding, is not now very prominent, though much more numerous in warm regions than would be supposed from a knowledge of the few European forms.

Imago with forewings more or less elongate-triangular, hindwings ovate, often rather small.

Type of markings indefinite; often none, or a vague reticulation only; when present, they are irregular.

Larva with 10 prolegs (except *Heterogeneidae*), usually with few hairs.

Pupa with segments 8-11 free, usually 7 also (except *Psychidae*), in ♂ 12 also; protruded from cocoon in emergence.

The four families can only be regarded as correlative developments from a common ancestral form, which must have closely approached the typical *Tineidae* (group of *Epichnopteryx*).

TABULATION OF FAMILIES.

1.	8 of hindwings connected with cell . .	2.
	,, ,, not connected with cell	2. ZEUZERIDAE.
2.	1c of forewings coincident with 1b posteriorly	1. PSYCHIDAE.
	,, ,, separate	3.
3.	Tongue developed . .	3. ZYGAENIDAE.
	,, obsolete . . .	4. HETEROGENEIDAE.

1. PSYCHIDAE.

Head densely rough-haired. Ocelli large. Tongue obsolete. Antennae ½ or less, in ♂ strongly bipectinated to apex. Labial palpi very short, hairy. Thorax densely hairy above and beneath. Abdomen, femora, and tibiae densely hairy, posterior tibiae without middle-spurs, end-spurs extremely short. Forewings: 1a anastomosing with 1b before middle, 1c (if present) coincident with 1b beyond middle, 7 absent. Hindwings: 8 connected by bar with upper margin of cell. ♀ apterous, without legs or developed antennae.

A rather small family of universal distribution, but commoner in warm countries. Male imago with thinly scaled wings, without markings; flight strong and swift, sometimes in sunshine. The female is almost wholly helpless; the abdomen is at first greatly distended with eggs, and ultimately shrivels up.

Ovum oval, smooth. Larva inhabiting a strong portable silken case, covered with fragments of stick or refuse. Pupa within the larval case.

Tabulation of Genera.

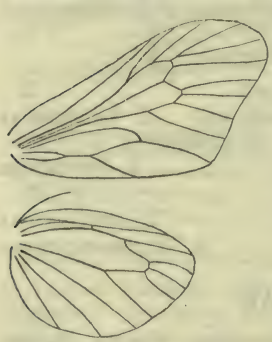
7 of hindwings present . . 2. Sterrhopterix.
,, absent . . . 1. Psyche.

1. Psyche, *Schrk.*

Forewings: 4 and 5 approximated at base, 8 and 9 connate or stalked. Hindwings: 4 and 5 sometimes stalked, 7 absent.

A moderate genus, ranging throughout the warmer regions of the Northern hemisphere.

Head and thorax pale brownish-ochreous . 1. *villosella.*
,, ,, fuscous-grey . . 2. *opacella.*



Neuration of *Psyche opacella.*

1. **P. villosella,** *O.* (*nigricans,* Stt.) 25-26 mm. Head, thorax, and abdomen pale brownish-ochreous. Forewings and hindwings thinly haired, dark brown; veins and base of cilia darker. ♀ with rounded frontal prominence.

Hants, Dorset, local; S. Europe, Asia Minor; 6. Larva dark fuscous, sides paler; head and 2-4 whitish, marked with blackish: case large, covered with short longitudinally placed pieces of twig; on *Calluna,* grass, etc.; 7-5, sometimes living two years.

2. **P. opacella,** *HS.* 18-21 mm. Head, thorax, and abdomen fuscous-grey. Forewings and hindwings very thinly haired, grey; veins and base of cilia darker. ♀ without frontal prominence.

Surrey to Dorset, Lancashire, Perth, local; C. Europe; 6, 7. Larva pale grey; head black; 2-4 with dark grey plates: case covered with longitudinally placed grass-fragments, seed-vessels, etc.; on grass (?); 8-5.

2. Sterrhopterix, *Hb.*

Forewings: 4 and 5 stalked, 9 and 10 stalked. Hindwings: 7 present, parallel to 6.

A limited group, principally inhabiting S. Europe and Asia.

1. **S. hirsutella,** *Hb.* (*fusca,* Hw.; *calvella,* O.) 21-23 mm.

Head, thorax, and abdomen fuscous-grey. Forewings and hindwings greyish, with very fine thinly scattered hairs.

Surrey, Middlesex, Lancashire, Durham, Perth, local; C. Europe; 6, 7. Larva brown; head and 2-4 whitish, much marked with black: case narrowed towards ends, covered with transversely placed fragments of stems, seed-vessels, etc.; on oak, hawthorn, *Salix*, etc.; 8-5.

2. ZEUZERIDAE.

Head rough-haired. Ocelli present. Tongue rudimentary. Antennae less than ½. Labial palpi very short, porrected, terminal joint pointed. Thorax hairy beneath. Abdomen very long, hairy. Femora hairy, posterior tibiae without middle-spurs. Forewings: 7 and 8 stalked, 9 connate with or out of 8 near base, both parting-veins strong. Hindwings: 4 and 5 somewhat approximated, 8 free or connected with 7.

This family is also small, widely distributed but mainly within the tropics. Imago with forewings elongate-triangular; flight powerful, nocturnal.

Ovum elongate-oval, smooth. Larva feeding in the stems of trees or plants. Pupa within the larval gallery; it is furnished with abdominal whorls of spines, by means of which it can traverse the gallery when about to emerge.

Tabulation of Genera.

8 of hindwings connected by bar with 7 . 2. ZEUZERA.
" " free . . 1. PHRAGMATOECIA.

1. PHRAGMATOECIA, *Newm.*

Antennae ⅓, in ♂ bipectinated throughout, on apical third very shortly. Palpi hairy. Tibiae hairy. Hindwings: 8 free.

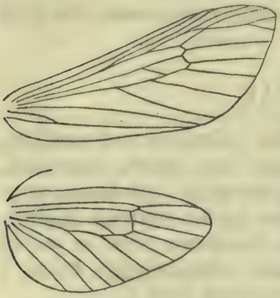
A small genus, principally Asiatic; only one species occurs in Europe.

1. **P. castaneae,** *Hb.* (*arundinis*, Hb.) 34-42 mm. Thorax pale brownish-ochreous. Forewings pale brownish-ochreous; interneural series of numerous very small indistinct fuscous spots. Hindwings very pale brownish-ochreous.

Surrey, Norfolk, Cambridge, local; C. Europe, C. Asia; 6, 7. Larva ochreous-whitish; head, 2, and 3 pale brown; subdorsal line pale purplish, sometimes nearly obsolete: in stems of reed (*Phragmites*); 6-5.

2. Zeuzera, *Latr.*

Antennae $\frac{1}{4}$, in ♂ strongly bipectinated, apical third simple. Palpi with appressed scales. Tibiae rough-scaled. Hindwings: 8 connected with 7 near beyond cell.



Neuration of *Zeuzera pyrina.*

Also principally inhabiting S. Asia, with one species reaching Europe. Larva feeding in solid wood.

1. **Z. pyrina**, *L.* (*aesculi*, L.) 50-64 mm. Thorax white, with two rows of blue-black spots. Forewings thinly scaled, white; numerous small scattered round or transverse-oval deep indigo-blue spots. Hindwings as forewings, but spots smaller and fainter.

England to York, Ayr, rather local and irregular; C. and S. Europe, Asia Minor, N. Africa, N. America (perhaps introduced); 6, 7. Larva yellow-whitish or dull yellowish, spots large, black; head and plates of 2 and 13 black-brown: in stems of elm, apple, birch, etc.; 6-5.

3. ZYGAENIDAE.

Ocelli present. Tongue developed. Antennae $\frac{2}{3}$, more or less thickened above middle. Labial palpi moderate, ascending, rough-haired, terminal joint short, pointed. Hindwings: 8 connected by bar with middle of upper margin of cell.

Rather an extensive family, but principally developed within the tropics, many of the species being remarkable for their brilliant colouring. The flight is diurnal, rather slow and heavy.

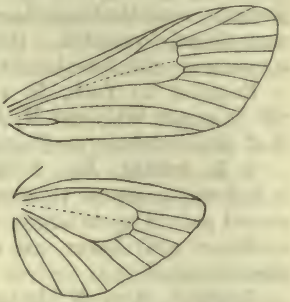
Ovum elongate-oval, finely ribbed or reticulated. Larva short, stout, feeding exposed on plants. Pupa in a strong elongate cocoon above ground.

Tabulation of Genera.

Forewings with 8 and 9 stalked . . 1. Zygaena.
" 8 and 9 separate . . 2. Procris.

1. Zygaena, *F.*

Head more or less rough-haired. Antennae gradually thickened from base to about $\frac{3}{4}$ or $\frac{4}{5}$, thence tapering to apex, simple. Thorax densely hairy beneath. Abdomen hairy. Femora more or less hairy beneath, tibiae smooth-scaled, all spurs present, short. Forewings: 8 and 9 stalked. Hindwings: 6 and 7 sometimes connate, upper margin of cell angulated at connection.


Neuration of *Zygaena trifolii*.

The genus is extensive, but confined to Europe, N. and C. Asia, Japan, and N. Africa, its range coinciding exactly with the limits of the Palaearctic region. Imago with forewings elongate-triangular. The species are very similar, often interbreed, and are particularly liable to form local races; so that their study is excessively difficult. The larvae are equally similar and variable.

1. Forewings with upper basal spot reaching to beyond $\frac{1}{3}$ . . 2.
" " " not reaching $\frac{1}{3}$ 3.
2. Forewings besides with four spots . 5. *exulans*.
" " with two elongate blotches 6. *pilosellae*.
3. Smaller, rather thinly scaled . . 4. *meliloti*.
Larger, not thinly scaled . . . 4.
4. Forewings six-spotted . . . 1. *filipendulae*.
" five-spotted . . . . 5.
5. Termen of forewings slightly rounded, middle spots separate . 2. *lonicerae*.
" " moderately rounded, middle spots usually confluent 3. *trifolii*.

1. **Z. filipendulae**, *L.* 28-35 mm. Abdomen deep green or indigo-blue. Forewings very deep green; six deep crimson spots, first pair subbasal, elongate, sometimes confluent, second pair sometimes confluent, sixth sometimes small. Hindwings deep crimson; a slender green-blackish terminal streak; cilia blue-blackish.

Britain to Caledonian Canal, Ireland, very common; Europe, Asia Minor, Syria; 6, 7. Larva dull green; a subdorsal series of black transverse spots, one broader and one narrower on each segment; a lateral series of black crescentic or divided spots; between these two series a row of yellow marks; head black: on *Trifolium*, *Lotus*, *Lathyrus*; 8-5.

2. **Z. lonicerae**, *Esp.* 28-35 mm. Antennal thickening rather slender, very gradual. Abdomen deep indigo-blue. Forewings very deep green; five deep crimson spots, first pair subbasal, elongate, sometimes confluent, upper of second pair small; termen slightly rounded. Hindwings deep crimson; a terminal streak and cilia blue-blackish.

England to York, N. and W. Ireland, local; N., C., and SW. Europe, WC. and N. Asia; 6, 7. Larva resembling that of *Z. filipendulae*: on *Trifolium*, *Lotus*, *Lathyrus*; 8-5.

3. **Z. trifolii**, *Esp.* 28-35 mm. Differs from *Z. lonicerae* as follows: antennal thickening stouter, less gradually pointed, second pair of spots larger, generally confluent, sometimes also confluent with lower one of first pair and with fifth, termen more rounded.

England, Ayr, N. Ireland, local; Europe, WC. and NW. Asia, N. Africa; 6, 7. Larva resembling that of *Z. filipendulae*, but pairs of black subdorsal spots often appearing X-shaped, lateral spots somewhat smaller: on *Trifolium* and *Lotus*; 8-5.

4. **Z. meliloti**, *Esp.* 24-27 mm. Differs from *Z. lonicerae* as follows: antennal thickening shorter, less gradual, wings more thinly scaled, forewings greyer, upper spot of second pair usually more elongate, a sixth spot sometimes obscurely indicated, termen more rounded, hindwings duller, terminal streak and cilia blackish.

Hants, Dorset, Lancashire, local; C. Europe, WC. and NW. Asia; 6, 7. Larva resembling that of *Z. filipendulae*, but black subdorsal and lateral spots almost wholly obsolete: on *Lotus*; 8-5. The egg of this species is said to be considerably larger than that of the three preceding, though the insect is much smaller.

5. **Z. exulans**, *Hoch.* 26-32 mm. Antennal thickening rather short and stout, obtuse-pointed. Abdomen with dense rough black hairs. Forewings thinly scaled, blackish-green or deep green; five deep crimson spots, first extending along basal half of costa to above third, second subbasal, third rather small, fourth and fifth large. Hindwings thinly scaled, crimson; a terminal streak and cilia blackish.

Aberdeen, above 2000 feet, local; mountains of N. and C. Europe; 7. Larva very dark green; an interrupted black lateral stripe marked with series of yellow transverse spots; head black: on *Silene*, *Alchemilla*, *Trifolium*, etc.; 8-6.

6. **Z. pilosellae**, *Esp.* (*minos*, Fuesl.; *nubigena*, Ld.) 27-31

mm. Antennal thickening stout, rather short, obtuse. Abdomen blue-blackish. Forewings thinly scaled, blue-blackish or green-blackish; three elongate crimson blotches, first along costa to beyond $\frac{1}{3}$, second in disc from base to beyond middle, third above second from before middle to $\frac{3}{4}$, apex much dilated. Hindwings thinly scaled, crimson; termen sometimes blackish near apex; cilia blue-blackish.

Forfar, Argyll, W. Ireland, local; Europe, WC. and N. Asia; 6, 7. Larva dark green or yellow-green; dorsal line whitish; a subdorsal series of black spots, usually single; a lateral series of yellow spots; head black: on *Thymus;* 8-5.

2. PROCRIS, *F.*

Head smooth. Antennae more or less thickened towards apex, in ♂ bipectinated. Thorax smooth beneath. Abdomen smooth. Femora smooth, posterior tibiae without middle-spurs. Forewings: 8 and 9 separate. Hindwings: 6 and 7 sometimes connate, upper margin of cell not angulated.

A genus of some extent, principally inhabiting Europe, Asia, and Australia. Imago with forewings less elongate than in *Zygaena.* The species are generally unicolorous, and their specific discrimination is often difficult. The larvae when young mine blotches between the surfaces of the leaf.

1. Antennae thickened apically, obtuse . . 2.
,, not thickened, pointed . 3. *globulariae.*
2. Forewings partly speckled with dark grey, termen straighter . . . 2. *statices.*
,, uniform, termen more rounded 1. *geryon.*

1. **P. geryon,** *Hb.* 20-23 mm. Antennae thickened towards apex, obtuse. Head and thorax golden-green or blue-green. Abdomen coppery-green. Forewings golden-green; termen rounded; cilia dark grey. Hindwings dark grey.

England, local; C. and SW. Europe, Asia Minor to Turkestan; 5, 6. Larva whitish or pale yellow, sides reddish-brown; dorsal line double, purplish-brown; subdorsal dull purple; subspiracular pale flesh-colour; head and plate of 2 black: on *Helianthemum;* 7-5.

2. **P. statices,** *L.* ♂ 26-30 mm., ♀ 23-25 mm. Differs from *P. geryon* as follows: abdomen blue-green, golden-green, or coppery, forewings usually more or less speckled with dark grey, termen straighter, hindwings more thinly scaled and therefore appearing lighter.

Britain to the Clyde, Ireland, rather local (infrequent in

Scotland); Europe, Asia Minor to N. Persia; 6. Larva whitish, yellow, or greenish, sides brownish or pink; dorsal line usually brown or pink; subdorsal series of spots sometimes pink; head black: on *Rumex acetosa;* 7-5. The imago bears a remarkable resemblance on the wing to a species of *Chrysopa* (a genus of *Neuroptera*) occurring in the same localities; probably an instance of protective mimicry, as the *Chrysopa* is uneatable.

3. **P. globulariae,** *Hb.* ♂ 26-30 mm., ♀ 18-20 mm. Antennae not thickened towards apex, pointed. Head and thorax golden-green or blue-green. Abdomen coppery or golden-green. Forewings golden-green; termen rounded; cilia grey. Hindwings grey, in ♀ rather darker.

Kent to Gloucester, local; C. and S. Europe, Asia Minor; 6. Larva green; a dorsal row of black spots; subdorsal line white; head and plate of 2 black: on *Centaurea nigra;* 7-5.

4. HETEROGENEIDAE.

Ocelli present. Tongue rudimentary or absent. Antennae ½ or more, in ♂ ciliated or simple. Labial palpi moderate, shortly rough-scaled beneath, terminal joint very short, somewhat pointed. Tibiae rough-haired. Forewings: 8 and 9 stalked, 8 to apex. Hindwings: 8 connected or anastomosing with upper margin of cell.

Though nowhere very conspicuous, this family attains a fair degree of development within the tropics, but is elsewhere scarce. Imago with forewings rather short-triangular; the species fly by night, and are retired in habit.

Ovum oval, smooth. Larva short, stout, attenuated towards extremities, without prolegs; feeding exposed on surface of leaves. Pupa with maxillary palpi well marked; in a firm short oval cocoon above ground. Some exotic larvae of this family have groups of protrusible stinging tentacles.

Tabulation of Genera.

Posterior tibiae with all spurs present . 2. Apoda.
„ „ without middle-spurs 1. Heterogenea.

1. Heterogenea, *Kn.*

Head with appressed hairs. Antennae ⅔, in ♂ filiform, simple. Palpi ascending. Thorax, abdomen, and femora not hairy. Posterior tibiae with middle-spurs absent, end-spurs long. Forewings: 10 out of 9 near base. Hindwings: 5 from transverse vein, tolerably parallel to 4, 6 and 7 tolerably remote at base, 8 connected by bar with middle of cell.

Only the one species is properly ascertained.

1. **H. asella,** *Schiff.* 15-20 mm. Forewings in ♂ dark purplish-fuscous, in ♀ rather dark ochreous-brownish. Hindwings blackish-grey.

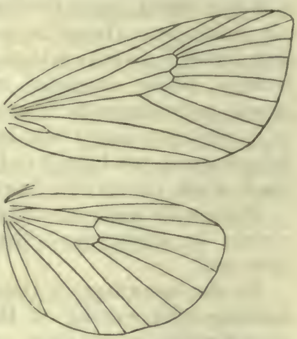
Surrey to Devon and Essex, local; C. Europe; 6, 7. Larva pale green; a broad brown yellowish-edged dorsal band, beginning on 3, narrowed on 5, becoming very broad on 7 and 8, thence diminishing: on beech, oak, poplar; 8-10.

2. APODA, *Hw.*

Head densely rough-haired. Antennae $\frac{1}{2}$, in ♂ dentate, ciliated. Palpi porrected. Thorax, abdomen, and femora hairy. Posterior tibiae with all spurs present. Forewings: 10 separate. Hindwings: 4 and 5 tolerably approximated, 6 and 7 connate, 8 anastomosing with cell from near base to middle.

It is doubtful how far other species which have been placed with this are to be regarded as truly congeneric.

1. **A. limacodes,** *Hufn.* (*testudo*, Schiff.) 26-29 mm. Forewings yellow-ochreous; a median line parallel to termen, not reaching costa, a mark from dorsum before tornus, and a line from $\frac{3}{4}$ of costa to below middle of termen dark brown or blackish; cilia sometimes mixed with blackish. Hindwings ochreous-orange mixed with blackish, dorsally clearer.



Neuration of *Apoda limacodes.*

Kent to Hants and Norfolk; C. and S. Europe, Asia Minor; 6. Larva green; subdorsal line yellow, pink-edged above; subspiracular yellowish; spiracles white: on beech and oak; 8-10.

7. TORTRICINA.

Head with dense erect scales. Ocelli usually present. Eyes glabrous. Tongue usually developed. Antennae under $\frac{2}{3}$. Maxillary palpi rudimentary or obsolete. Labial palpi with second joint more or less rough-scaled, terminal rather short, obtuse. Tibiae with all spurs present, usually long. Forewings: 1b strongly furcate, 1c more or less developed, 3, 4, 5 more or less approximated. Hindwings with frenulum, 1b with well-developed basal furcation, 1c present (except sometimes in *Epiblemidae*), 6 and 7 usually approximated or stalked, 8 approximated to anterior half of upper margin of cell, sometimes connected with it, thence diverging.

This is a very large group, everywhere present, but much more characteristic of temperate regions than of tropical. Excepting the *Trypanidae*, the species are usually of small size; the greater number fly towards sunset.

Imago with forewings oblong-triangular, hindwings trapezoidal or elongate-ovate.

Type of markings: Forewings with a basal patch, a central fascia, and sometimes a costal patch before apex, or a round metallic-edged patch (*ocellus*) above tornus. Hindwings without markings. Ovum flattened-oval, usually smooth, sometimes reticulated. Larva rather elongate, with few hairs, with 10 prolegs; living concealed in rolled or joined leaves, or spun shoots, or in stems or flower-heads or roots. Usually there are no markings; hence the leaf-feeding forms, being often very polyphagous, are hardly to be discriminated. The head is often black when young and light-coloured later.

Pupa with segments 8-11 free, in ♂ 12 also; protruded from cocoon in emergence; usually in the situation where the larva fed.

In the forewings of the imago there is often a longitudinal dividing-vein cutting off the upper posterior angle of the cell, thus forming an auxiliary cell, but the character seems variable and uncertain, and of no systematic value; also sometimes a forked vein traversing the middle of the cell, best seen in the *Trypanidae*, the upper fork being usually absent in the other families. In the males of many forms the basal portion of the costa of forewings is folded over above, and often includes some expansible hairs (probably a scent-organ); this is termed the *costal fold.*

The four families may be considered as nearly correlated branches from a common ancestor, nearly approaching the *Scardia* group of the *Tineidae*; though the *Epiblemidae* may not improbably be derived from an early form of *Tortricidae*.

TABULATION OF FAMILIES.

1. 9 of forewings out of 7 . . 4. TRYPANIDAE.
„ „ separate . . . . 2.

2. 2 of forewings from beyond ¾ of cell . . 3. PHALONIADAE.
„ „ from before ¾ of cell . . . 3.
3. Lower median vein of hindwings hairy towards base; uncus not developed . 1. EPIBLEMIDAE.
Lower median vein of hindwings not hairy (except *Sparganothis*); uncus developed 2. TORTRICIDAE.

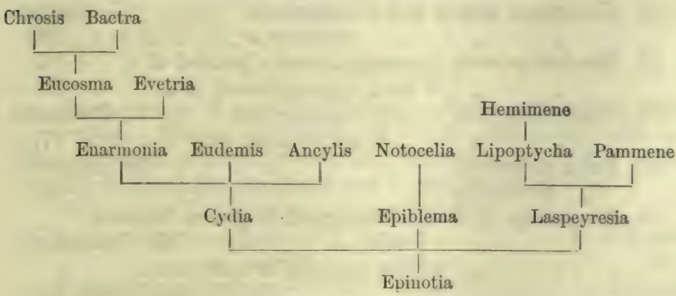
1. EPIBLEMIDAE.

Forewings: 2 from before ¾ of lower margin of cell, 9 separate. Hindwings: lower median vein hairy towards base. Uncus not developed.

A very extensive family, mainly characteristic of temperate regions of the Northern hemisphere; elsewhere it is less numerous than the *Tortricidae.* The species are all small or rather small. Forewings with central fascia oblique, running from about middle of costa to dorsum before tornus; ocellus normally well-defined; costal patch undefined.

The genera are rather ill-defined, the more important structural characters being very uniform; hence it is necessary to utilise slighter points in some instances. The phylogeny is correspondingly difficult, for where all are so closely connected, it is hard to determine which are most nearly allied. It is indicated for the principal genera in the diagram.

PHYLOGENY OF EPIBLEMIDAE.


Chrosis
Bactra
Eucosma
Evetria
Hemimene
Enarmonia
Eudemis
Ancylis
Notocelia
Lipoptycha
Pammene
Cydia
Epiblema
Laspeyresia
Epinotia

TABULATION OF GENERA.

1. Hindwings with 6 and 7 remote at base . . 2.
„ „ „ closely approximated or stalked . . 3.

2. Forewings in ♂ with costal fold . . 18. HEMIMENE.
,, ,, without costal fold 19. LIPOPTYCHA.
3. Apex of forewings falcate, acute . . 12. ANCYLIS.
,, ,, not falcate . . . 4.
4. Forewings with 7 and 8 stalked . . . 5.
,, ,, ,, separate . . . 6.
5. Hindwings with 3 and 4 stalked . . 11. EUDEMIS.
,, ,, ,, connate . . 20. ACROCLITA.
6. Forewings in ♂ with costal fold . . . 7.
,, ,, without costal fold . . 9.
7. Hindwings in ♂ with subdorsal hair-pencil in groove . . 15. NOTOCELIA.
,, ,, without subdorsal hair-pencil . 8.
8. Hindwings in ♂ with subcostal hair-pencil 16. SPHAEROECA.
,, ,, without subcostal hair-pencil 17. EPIBLEMA.
9. Antennae in ♂ with deep notch on stalk 10. TMETOCERA.
,, ,, not notched . . . 10.
10. Antennae in ♂ with very long cilia (4) . 8. ASTHENIA.
,, ,, moderately ciliated or simple . 11.
11. Hindwings with 3, 4, 5 equidistant at origin . 12.
,, ,, ,, not equidistant at origin . 13.
12. Hindwings with 3, 4, 5 rather widely remote 2. CHROSIS.
,, ,, ,, closely approximated 3. BACTRA.
13. Hindwings in ♂ with elongate dorsal lobe 4. EXARTEMA.
,, ,, without elongate dorsal lobe . 14.
14. Forewings with 4 and 5 connate . . 7. EVETRIA.
,, ,, ,, separate . . . 15.
15. Hindwings with 5 straight, nearly parallel to 4 . 16.
,, ,, 5 bent, approximated to 4 . 19.
16. Hindwings with 7 in ♂ running into 8 . 21. PAMMENE.
,, ,, ,, not running into 8 . 17.
17. Palpi porrected . . . . 24. EPINOTIA.
,, ascending . . . . . 18.
18. Hindwings in ♂ with hair-pencil in groove beneath cell . . 23. CARPOCAPSA.
,, ,, without groove or hair-pencil 22. LASPEYRESIA.
19. Forewings with termen sinuate; thorax not crested 20.
,, ,, ,, straight or rounded (rarely subsinuate, and then with crested thorax) 21.
20. Palpi ascending . . . 13. GYPSONOMA.
,, porrected . . . . 14. CYDIA.

21. Hindwings with 3 and 4 stalked . . 9. Enarmonia.
„ „ „ not stalked . . 22.
22. Thorax crested . . . . . 23.
„ smooth . . . . 6. Pamplusia.
23. Forewings with 10 rising much nearer 11 than 9
1. Lobesia.
„ „ 10 not nearer 11 than 9 5. Eucosma.

1. Lobesia, *Gn.*

Antennae in ♂ simple. Palpi moderate, porrected. Thorax with posterior crest. Forewings with termen straight, 10 rising much nearer to 11 than to 9. Hindwings: 3 and 4 closely approximated at base, 5 approximated to 4, 6 and 7 closely approximated towards base.

Restricted to the single species; the imago flies freely in the sunshine.

1. **L. permixtana**, *Hb.* (*reliquana*, Wilk., non Hb.) 11-12 mm. Forewings ferruginous-ochreous, somewhat mixed with black; a triangular blackish dorsal spot before middle, connected with costa by a fascia of whitish-ochreous striae; a blackish triangular blotch on middle of costa, and a blackish triangular tornal spot, more or less confluent; some pale strigulae on costa posteriorly. Hindwings in ♂ white, suffused with dark grey towards apex, in ♀ blackish-grey.

England, Ayr, S. Ireland, rather common; C. Europe, WC. Asia to N. Persia; 5. Larva dark purple-crimson; tubercular spots small, white; head and plate of 2 pale brown: on blackthorn and birch; 7, 8.

2. Chrosis, *Gn.*

Antennae in ♂ shortly ciliated. Palpi moderately long, porrected. Thorax with posterior crest. Forewings with termen straight or slightly rounded. Hindwings: 3, 4, 5 rather widely and equally remote, 6 and 7 connate or stalked.

Only a few European species are known.

1. Forewings conspicuously narrow . . 2. *littoralis.*
„ not narrow . . . . 2.
2. Forewings ochreous-whitish . . 1. *fuligana.*
„ pale reddish-ochreous . 3. *euphorbiana.*

1. **C. fuligana**, *Hw.* (*abscissana*, Dbld.) 10-13 mm. Forewings ochreous-whitish, strigulated with dark fuscous; basal patch, central fascia, and terminal fascia narrowed to tornus dark brown. Hindwings grey.

Kent to Norfolk and Cambridge, I. of Wight, Devon, local; Holland; 5, 7. Larva blue-green; head and plate of 2 yellowish-brown: in shoots of *Carduus arvensis;* 6, 9.

2. **C. littoralis,** *Curt.* 12-15 mm. Forewings elongate, narrow, ochreous or pale greyish-ochreous, sometimes rosy-tinged, faintly striated; basal patch deeper or ferruginous, edge angulated, black-marked near dorsum; narrow central fascia, and terminal fascia narrowed to both extremities deeper or ferruginous, sometimes partially black-marked. Hindwings pale grey, terminally darker.

Britain to the Shetlands, Ireland, locally plentiful on coasts; WC. and SW. Europe; 6, 7, 9, 10. Larva pale greenish-grey, or sometimes dark brown; head light brown; plate of 2 black: in shoots and flower-heads, and on leaves of *Armeria;* 4, 5, 8.

3. **C. euphorbiana,** *Frr.* 10-12 mm. Forewings pale reddish-ochreous, more or less strigulated or mixed with black; basal patch, central fascia, and terminal fascia narrowed to tornus ferruginous, often much mixed with black; between basal patch and central fascia a paler or ochreous-whitish quadrate dorsal spot; usually an irregular postmedian stria and some terminal marks leaden-grey. Hindwings blackish-grey.

Kent, Wilts, Worcester, Hereford, local; C. Europe; 6, 8. Larva dark green; head pale brown; plate of 2 black: in shoots of *Euphorbia amygdaloides* and *E. paralias;* 7, 9. The imago flies in hot sunshine.

3. BACTRA, *Stph.*

Antennae in ♂ moderately ciliated. Palpi moderately long, porrected. Thorax smooth. Forewings with termen straight. Hindwings: 3, 4, 5 closely approximated at base, 6 and 7 stalked.

Contains only two or three very wide-ranging species; it does not seem probable that they have been artificially introduced; species of *Juncus* are found in all countries.

Central fascia traceable throughout . . 2. *furfurana.*
„ „ incomplete . . . 1. *lanceolana.*

1. **B. lanceolana,** *Hb.* 14-22 mm. Forewings pale ochreous or ochreous-brownish, costa strigulated with darker ochreous or dark fuscous; a spot in disc at $\frac{1}{3}$, and an angular mark beyond middle dark fuscous, often obsolete, sometimes forming a more or less complete dark median streak from base to apex; central fascia sometimes indicated on costa. Hindwings grey.

Britain to the Shetlands, Ireland, very common; Europe, N and C. Asia, N. America, N. Africa, Australia, New Zealand; 6-9. Larva greenish or whitish-fleshcolour; head and plate of 2 black: in stems of *Juncus;* 4-6.

2. **B. furfurana,** *Hw.* 13-16 mm. Forewings slightly narrower than in *B. lanceolana,* costa straighter; light ochreous or ochreous-brownish, indistinctly darker-strigulated; basal patch, central fascia, and an apical streak darker ochreous or brown, indistinct, sometimes nearly obsolete. Hindwings grey.

Britain to the Clyde, S. Ireland, local; C. Europe, WC. Asia to N. Persia, N. America; 6, 7. Larva shining green; head black, with a whitish line; plate of 2 dark brown: in stems of *Eleocharis lacustris* and *Juncus conglomeratus;* 5.

4. EXARTEMA, *Clem.*

Antennae in ♂ shortly ciliated. Palpi moderately long, ascending. Thorax with posterior crest. Forewings with termen slightly rounded. Hindwings in ♂ with elongate dorsal lobe; 3 and 4 connate, 5 somewhat approximated to 4, 6 and 7 closely approximated towards base.

A small N. American genus, of which only one species is found in Europe.

1. **E. latifasciana,** *Hw.* 10-13 mm. Face white. Forewings yellow, strigulated with dark fuscous and striated with leaden-grey, more strongly posteriorly; basal patch and central fascia dark fuscous, space between them forming a broad slightly curved pale striated fascia; a dark fuscous streak from costa at $\frac{2}{3}$ to middle of termen. Hindwings dark grey.

Kent to Dorset, Worcester, local and uncommon; Holland, Germany; 6, 7. Larva pale yellow; head black; plate of 2 reddish: in galleries in moss (*Hepatica*) on tree-trunks; 4, 5.

5. EUCOSMA, *Hb.*

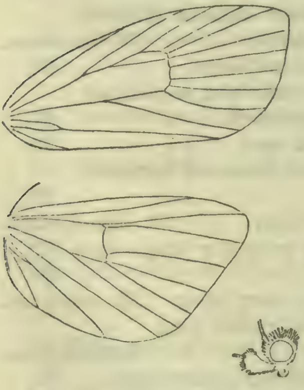
Antennae in ♂ shortly or moderately ciliated. Palpi moderately long, porrected or subascending. Thorax with posterior usually bifid crest. Forewings with termen straight or slightly rounded (rarely subsinuate). Hindwings: 3 and 4 connate or closely approximated at base, 5 approximated to 4, 6 and 7 closely approximated towards base or stalked; rarely with rudimentary dorsal lobe.

A large genus, but almost wholly confined to the temperate regions of the Northern hemisphere; it is derived from *Enarmonia.* In using the following tabulation, it should be observed that in dark specimens of *profundana*, *lacunana*, and *branderiana* the markings are sometimes obsolete.

1. Forewings with apical third conspicuously paler . 2.
   ,, ,, apical third not conspicuously paler 13.
2. Antemedian space mostly whitish . 5. *corticana*.
   ,, ,, not mostly whitish . . 3.
3. Forewings with extreme apex blackish-marked . 4.
   ,, ,, ,, not blackish-marked 8.
4. Posterior edge of central fascia with abrupt median indentation 16. *sauciana*.
   ,, ,, ,, without conspicuous indentation . 5.
5. Posterior edge of central fascia with angular median prominence 11. *pruniana*.
   ,, ,, ,, without marked prominence . . 6.
6. Forewings with distinct transverse tornal mark . 7.
   ,, without such mark . . 12. *oblongana*.
7. Tornal mark pale grey . . 13. *gentianana*.
   ,, ,, pale ochreous . . 14. *sellana*.
8. Two or more black dots in disc beyond central fascia 9.
   At most one dark spot beyond central fascia . 12.
9. Central fascia posteriorly with triangular projection surmounted by two dots . 9. *variegana*.
   ,, ,, without such character . . 10.
10. Central fascia posteriorly subconvex 10. *ochroleucana*.
    ,, ,, ,, subconcave . . 11.
11. Central fascia posteriorly with abrupt median indentation . . 7. *capreana*.
    ,, ,, ,, without such indentation 8. *sororculana*.
12. Central fascia followed by dark median spot 15. *dimidiana*.
    ,, ,, not followed by dark spot 6. *betulctana*.
13. Base and dorsum conspicuously paler . 1. *salicella*.
    ,, ,, not markedly paler . . 14.
14. Forewings with black metallic-dotted submedian patch . . . 22. *arcuella*.
    ,, without such patch . . . 15.
15. Basal patch not traceable, forewings reticulated . 16.
    ,, ,, more or less indicated . . 19.
16. Head and thorax pinkish-ochreous . . 17.
    ,, ,, fuscous . . . . 18.

17. Forewings reticulated with rosy . 25. *purpurana.*
,, ,, with ferruginous . 24. *rufana.*
18. Forewings rather dark purplish-fuscous 26. *mygindana.*
,, not dark fuscous . . 23. *arbutella.*
19. Central fascia with black median dash, below it more or less obsolete . . 20.
,, ,, without black median dash . 22.
20. Head and collar blackish, thorax whitish . 2. *woodiana.*
Head and thorax grey . . . . 21.
21. Dorsum of forewings suffused with fuscous 4. *hartmanniana.*
,, ,, not suffused with fuscous 3. *semifasciana.*
22. Forewings with suffused pale ochreous dorsal blotch 19. *nigricostana.*
,, without such blotch . . . 23.
23. Forewings with triangular dark central blotch 41. *antiquana.*
,, without such blotch . . . 24.
24. Central fascia not reaching dorsum . 40. *ericetana.*
,, ,, entire . . . . 25.
25. Central fascia with abrupt narrow anterior indentation above middle . 34. *lacunana.*
,, ,, without such indentation . . 26.
26. Forewings with dark praetornal spot, sometimes touching central fascia . . 27.
,, without praetornal spot . . 35.
27. Forewings with dark subapical fascia or terminal patch . . . . 28.
,, without such markings 38. *branderiana.*
28. Central fascia with two sharp posterior projections 29.
,, ,, not so formed . . . 30.
29. Palpi porrected, terminal joint very short 36. *cespitana.*
,, ascending, terminal joint rather long 35. *doubledayana.*
30. Forewings partly reddish or ferruginous-tinged 31.
,, without reddish or ferruginous tinge 34.
31. Edge of basal patch angulated . . 27. *schulziana.*
,, ,, sinuate . . . 32.
32. Praetornal spot hardly separate from central fascia 33. *urticana.*
,, ,, markedly separate . . 33.
33. Subapical fascia straight . . . 29. *rivulana.*

Subapical fascia anteriorly angulated 28. *palustrana.*
34. Markings darker greyish-ochreous . 32. *irriguana.*
„ „ formed by a coarse black irroration 30. *metallicana.*
35. Basal patch blackish-mixed . . . 36.
„ „ not blackish-mixed . . 39. *striana.*
36. Central fascia enclosing pale median spot 31. *micana.*
„ „ without pale spot . . . 37.
37. Forewings with ground-colour whitish . 37. *bifasciana.*
„ „ „ not whitish . 38.
38. Forewings with dark median subterminal blotch 20. *profundana.*
„ without such blotch . . . 39.
39. Forewings with ground-colour ferruginous-ochreous 21. *postremana.*
„ „ „ not ochreous . 40.
40. Markings mixed with dark ferruginous-brown 17. *fuligana.*
„ blackish . . . 18. *carbonana.*



Neuration and head of *Eucosma lacunana.*

1. **E. salicella,** *L.* 19-21 mm. Forewings rather dark brown, spotted with black, and irregularly marked with leaden-grey; base and dorsum broadly whitish, with some black strigulae near dorsum towards base. Hindwings fuscous, darker terminally.

England to York, rather local; C. Europe, N. Asia; 7. Larva dull red-brown; tubercular spots, head, and plate of 2 black: on *Salix*; 5.

2. **E. woodiana,** *Barr.* 16-18 mm. Head and collar blackish, thorax whitish. Forewings white, strigulated and posteriorly striated with grey; basal patch dorsally dark grey; a grey black-marked central costal blotch narrowed beneath and ending in a black median dash. Hindwings grey, darker posteriorly.

Hereford, local; not known elsewhere; 7. Larva green; head and plate of 2 black: mining blotches in leaves of mistletoe (*Viscum*); 9-5.

3. **E. semifasciana**, *Hw.* 17-20 mm. Head and thorax grey. Forewings grey, closely striated with whitish; basal patch and a subtriangular central costal blotch fuscous, black-marked, apex of blotch truncate, marked with a black dash; costa posteriorly fuscous-spotted; a darker black-dotted subterminal mark in middle. Hindwings grey, darker posteriorly.

England, local; C. Europe; 7. Larva green; dorsal and subdorsal lines darker; head and plate of 2 yellowish-green: on *Salix caprea;* 5, 6.

4. **E. hartmanniana**, *L.* (*scriptana*, Hb.) 17-19 mm. Head and thorax grey. Forewings whitish, strigulated and indistinctly striated with fuscous, dorsum suffusedly fuscous; edge of basal patch forming an indistinct darker black-marked fascia, appearing sharply angulated below middle; central fascia darker, black-marked, most distinct on upper half, marked with a black median dash and obscurely interrupted below this; some black dots towards termen in middle. Hindwings grey, darker posteriorly.

England to York, local; C. Europe, N. America; 7. Larva light green; head brown: on *Salix alba* and *S. fragilis;* 5.

5. **E. corticana**, *Hb.* (*picana*, Fröl.) 18-21 mm. Forewings white, margins strigulated with dark fuscous; edge of basal patch, an irregular dorsal streak, and central fascia with anterior edge strongly projecting in middle to touch basal patch dark brown, irrorated with ashy-whitish and marked with black, fascia with a black median dash. Hindwings grey, darker posteriorly.

Britain to Ross, local; C. Europe; 7. Larva light green; head greenish: on birch; 5.

6. **E. betuletana**, *Hw.* 17-21 mm. Forewings white, sometimes partly ochreous-tinged, with some grey striae posteriorly; basal patch and central fascia dark brown, black-marked, included space dark ashy-fuscous, all slightly whitish-sprinkled, on fold sometimes more mixed with white; posterior edge of fascia nearly straight, followed in middle by a faint pinkish-ochreous tinge. Hindwings grey, darker posteriorly.

Britain to Ross, E. Ireland, common; N. and C. Europe; 8. Larva green, incisions yellowish; dorsal and subdorsal lines grey-green; tubercular spots yellow; head yellow-green; plate of 2 pale green: on birch; 5, 6.

7. **E. capreana**, *Hb.* 17-21 mm. Forewings white, sometimes ochreous-tinged, with some partly faint grey striae posteriorly; basal patch, central fascia, and included space

brown mixed with dark ashy-fuscous and marked with black, slightly whitish-sprinkled, space more whitish towards costa, posterior edge of fascia slightly concave, in middle abruptly indented; a subapical group of several black dots. Hindwings grey, darker posteriorly.

England, local; N. and NC. Europe, N. America; 6. Larva greyish-green; dots black; head black: on *Salix caprea*; 5.

8. **E. sororculana**, *Zett.* (*praelongana*, Gn.) 17-20 mm. Forewings narrower than in *E. betuletana*, white, sometimes partly ochreous-tinged, posteriorly with thick grey striae; basal patch, central fascia, and included space brown much spotted with black, somewhat mixed with white, especially on space towards costa, posterior edge of fascia slightly concave, with two prominences on lower half; a brown terminal streak from apex, preceded by several black dots. Hindwings light grey, darker terminally.

Britain to Sutherland, S. Ireland, local; N. and C. Europe; 5, 6. Larva on birch; 8.

9. **E. variegana**, *Hb.* (*cynosbatella*, Wilk.) 16-21 mm. Forewings ochreous-white, towards termen clouded with ochreous-grey, with faint posterior silvery-metallic striae; basal patch, central fascia, and included space brown mixed with dark leaden-grey and spotted with black, slightly whitish-sprinkled, posterior edge of fascia with a triangular projection below middle, and followed in middle by two black dots. Hindwings grey, darker terminally.

Britain to the Clyde, E. Ireland, common; C. and S. Europe, Asia Minor; 6, 7. Larva dark olive-green; tubercular dots, head, and plate of 2 black: on hawthorn, blackthorn, and cherry; 5.

10. **E. ochroleucana**, *Hb.* 18-21 mm. Forewings whitish-ochreous, faintly pink-tinged, margins posteriorly grey-spotted; basal patch, central fascia, and included space brown mixed with dark ashy-grey and black, space strigulated with whitish-ochreous on costa and fold, posterior edge of fascia slightly convex, indented above and below middle; two or more black dots and a grey spot between middle of fascia and termen. Hindwings grey, terminally darker.

Britain to Ross, N. Ireland, rather common, scarcer northwards; C. Europe; 6, 7. Larva dark green; dorsal line darker; dots black, pale-ringed; head and plate of 2 dark brown: on rose and apple; 5.

11. **E. pruniana**, *Hb.* 14-17 mm. Forewings white, sometimes partly ochreous-tinged, more or less strigulated posteriorly with dark fuscous; basal patch, central fascia, and included space dark brown mixed with dark ashy-fuscous and blackish, somewhat whitish-sprinkled, especially in space on costa and fold, posterior edge of fascia with angular prominence in middle, sometimes followed by one or two dark dots; a greyish subterminal streak; extreme apex blackish-fuscous. Hindwings grey, in ♀ darker.

Britain to Ross, Ireland, very common; C. and S. Europe, WC. Asia to N. Persia; 6, 7. Larva bright green; tubercular spots, head, and plate of 2 black: on blackthorn and cherry; 5.

12. **E. oblongana**, *Hw.* (*marginana*, Hw.; *similana*, Wilk.) 11-15 mm. Forewings narrower than in *E. pruniana*, ochreous-white, costa spotted with black; basal patch, central fascia, and included space dark ashy-grey mixed with ferruginous-brown and black, somewhat white-sprinkled, space white-edged towards dorsum and suffused with white on costa, central fascia with a white median dot near irregular posterior edge; a subterminal group of black dots; apex and termen marked with dark fuscous. Hindwings in ♂ whitish, in ♀ grey, termen in both suffused with dark grey.

Britain to the Orkneys, rather local; C. and S. Europe, Asia Minor, N. Africa; 5-8. Larva pale ochreous; head and plate of 2 black: in seedheads of *Stachys betonica*, *Galeopsis*, and *Dipsacus*; 9-5.

13. **E. gentianana**, *Hb.* 13-18 mm. Differs from *E. oblongana* as follows: forewings with costa more arched, more ochreous-tinged, a pale grey cloudy tornal mark reaching half across wing; hindwings in both sexes fuscous, darker terminally.

England to York, E. Ireland, rather common; C. Europe; 7. Larva yellow-whitish; head and plate of 2 black: in pith of seedheads of *Dipsacus*; 9-5.

14. **E. sellana**, *Hb.* 13-15 mm. Differs from *E. oblongana* as follows: forewings with costa more arched, more ochreous-tinged, subterminal black dots merged in a subtriangular dark terminal patch, apex more ferruginous-marked, a pale ochreous tornal mark reaching half across wing; hindwings in ♂ light grey, termen suffused with dark grey.

England, local; C. and S. Europe; 6, 7. Larva in heads of *Centaurea*; 9-5.

15. **E. dimidiana**, *Sodof.* (*ochromelana*, Gn.) 14-15 mm. Forewings suboblong, whitish-rosy, ochreous-tinged; basal patch and central fascia dark fuscous mixed with brown and black, included space suffused with dark fuscous in middle and dorsally, fascia followed in middle by a dark fuscous spot; some pale brownish striae towards apex. Hindwings grey, in ♀ darker.

Sussex, Hants, York to Ross, Ireland, local; N. and C. Europe, N. America; 6. Larya blackish-grey; tubercular spots, head, and plate of 2 black: on *Myrica;* 8-10.

16. **E. sauciana**, *Hb.* (*grevillana*, Curt.; *staintoniana*, Barr.) 13-16 mm. Forewings elongate, ochreous-white, posteriorly striated with blackish; basal patch, central fascia, and included space dark ashy-grey mixed with black, sometimes whitish-sprinkled, posterior edge of fascia subconcave, irregular, with an abrupt curved indentation in middle; extreme apex blackish. Hindwings dark grey.

Kent to Hants, Cheshire to York, Perth to Sutherland, S. Ireland, local; N. and C. Europe; 6. Larva on *Vaccinium myrtillus;* 8, 9.

17. **E. fuligana**, *Hb.* (*ustulana*, Hw.) 10-13 mm. Forewings elongate, dark ashy-fuscous, strigulated with dark brown; basal patch, central fascia, and an apical reticulated patch dark brown, ferruginous-tinged, blackish-mixed; costa sometimes obscurely whitish-strigulated. Hindwings dark fuscous.

England, rather local; Germany; 6, 7. Larva greenish-whitish: in rootstocks of *Ajuga reptans;* 9-5.

18. **E. carbonana**, *Barr.* 10-13 mm. Forewings more elongate than in *E. fuligana*, ashy-grey, more or less whitish-mixed, posteriorly striated with blackish; basal patch and central fascia blackish. Hindwings blackish-grey.

Devon, Norfolk, Cambridge, local; Holland; 6, 7. Larva pale green; head reddish-brown; plate of 2 green: in stems of *Stachys palustris;* 9-5.

19. **E. nigricostana**, *Hw.* 12-14 mm. Forewings blackish-grey, striated with brown-black; edge of basal patch darker, angulated; central fascia blackish, but partially obliterated by a pale ochreous more or less developed suffused median dorsal blotch, reaching more than half across wing. Hindwings dark fuscous.

England to York, common; Holland, Germany; 6. Larva pale yellowish; head pale brown: in stems and rootstocks of *Stachys sylvatica;* 9-5.

20. **E. profundana**, *F.* 14-19 mm. Forewings brownish-ochreous or whitish-ochreous, partially suffused with deeper ochreous, striated with leaden-grey, sometimes mostly suffused with dark ashy-fuscous; costa strigulated with dark fuscous; basal patch often pale-mixed with edge angulated in middle, central fascia with anterior edge dorsally obsolete, and a subquadrate subterminal blotch in middle dark ochreous-brown, more or less blackish-marked. Hindwings fuscous, darker posteriorly.

England to York, rather common; C. Europe; 7, 8. Larva dark green; head pale brownish: on oak; 6.

21. **E. postremana**, *Z.* 14-15 mm. Palpi whitish-ochreous. Forewings ferruginous-ochreous, much mixed with black, with metallic leaden-grey striae becoming whitish on costa; basal patch and central fascia mostly blackish; cilia with a paler or sometimes whitish tornal spot. Hindwings dark fuscous, in ♂ lighter basally.

Lancashire, Westmoreland, local; C. Europe; 6. Larva pale yellow; head and plate of 2 black: in stems of *Impatiens noli-me-tangere;* 8-5.

22. **E. arcuella**, *Cl.* 16-18 mm. Forewings deep orange; three short longitudinal streaks from base, a straight transverse antemedian streak, a curved oblique interrupted postmedian streak, and two oblique anteapical streaks steelblue-metallic; a round median discal patch, upper half dark grey becoming whitish-ochreous towards centre, lower half black marked with orange and containing four steelblue-metallic dots. Hindwings blackish-grey; in ♂ with rudimentary dorsal lobe.

Britain to Stirling, in woods, common; C. and S. Europe, N. and WC. Asia, Japan; 5, 6. The dorsal lobe of the hindwings is so rudimentary that it appears insufficient for generic separation; yet in the large Japanese form of the species it is more distinct.

23. **E. arbutella**, *L.* 14-16 mm. Head and thorax fuscous, crimson-tinged. Forewings reddish-ferruginous, irregularly striated with leaden-grey. Hindwings grey.

Lancashire to Sutherland, local; N. and C. Europe; 6. Larva blackish-grey: on *Arctostaphylos;* 4, 5.

24. **E. rufana**, *Sc.* 15-17 mm. Head and thorax pinkish-ochreous. Forewings shorter and broader than in *E. purpurana*, costa more strongly arched; pale greyish-ochreous strigulated with fuscous, reticulated throughout with bright ferruginous. Hindwings light grey.

Lancashire to Cumberland, local; C. Europe; 6, 7.

25. **E. purpurana**, *Hw.* 16-19 mm. Head and thorax pinkish-ochreous. Forewings elongate, costa gently arched; whitish-ochreous, irrorated with darker or brownish, and reticulated throughout with light crimson-rosy. Hindwings light grey.

S. England to Pembroke and Norfolk, E. Ireland, local; C. Europe; 6, 7. Larva yellow-whitish; head reddish-brown; plate of 2 pale ochreous: on roots of *Sonchus arvensis* and *Taraxacum*; 5, 6.

26. **E. mygindana**, *Schiff.* (*flammeana*, Hb.; *fulvipunctana*, Hw.) 16-19 mm. Head and thorax rather dark fuscous. Forewings rather dark purplish-fuscous, reticulated throughout with ferruginous or ferruginous-brown; central fascia sometimes distinctly defined. Hindwings grey, in ♀ darker.

Kent, Norfolk, Lancashire to Sutherland, W. Ireland, local; N. and C. Europe, Asia Minor; 6, 7. Larva dark red; head black: on *Vaccinium*, *Myrica*, and *Arctostaphylos*; 4, 5.

27. **E. schulziana**, *F.* 18-24 mm. Forewings shining whitish, irregularly striated with ferruginous-red, with some leaden-grey marks before and beyond middle, costa blackish-marked; basal patch partly ferruginous-red, edge angulated, indented below angle; central fascia, a transverse dorsal spot beyond it, and a subapical fascia ferruginous-red, black-sprinkled; cilia barred. Hindwings grey, in ♀ darker.

Surrey, Hants, Stafford to the Shetlands, N. and E. Ireland, common northwards on moors; N. and C. Europe; 7, 8.

28. **E. palustrana**, *Z.* 13-15 mm. Forewings whitish, striated or posteriorly reticulated with pale ferruginous-ochreous, costa black-marked; basal patch with edge obliquely sinuate, central fascia narrowed on dorsum and with posterior projection below middle, a triangular praetornal spot, and subapical fascia with anterior edge angulated in middle ferruginous much marked with black, especially in ♀. Hindwings rather dark grey.

Scotland to Ross, local; N. and C. Europe; 6, 7.

29. **E. rivulana**, *Sc.* (*conchana*, Hb.) 15-18 mm. Forewings with termen faintly sinuate; whitish, striated with brown and grey; a sinuate fascia limiting basal patch, central fascia with posterior indented prominence in middle, subtriangular praetornal spot, straight subapical fascia, and triangular apical spot trifurcate on costa ferruginous-brown more or less sprinkled with black. Hindwings light grey.

Britain to Perth, N. and E. Ireland, locally plentiful; N. and C. Europe, WC. and N. Asia, N. America; 7. Larva dull yellow-green; head and plate of 2 black: on flowers of *Genista tinctoria*, *Orchis*, etc.; 5, 6.

30. **E. metallicana**, *Hb.* (*alternana*, Wilk.; *daleana*, Dbld.) 15-18 mm. Forewings light greyish-ochreous; basal patch, central fascia with posterior edge angulated in middle, a dorsal spot immediately beyond and often confluent with fascia, and a subapical fascia narrowed beneath formed by a coarse black irroration, sometimes edged with metallic-grey, often wholly or partially concealed in a general black irroration. Hindwings grey, in ♀ darker.

Perth, local, on mountains; N. and C. Europe, N. Asia; 7.

31. **E. micana**, *Fröl.* (*olivana*, Tr.) 14-17 mm. Forewings pale greyish-ochreous, sometimes more or less mixed with pale ferruginous; costa spotted with fuscous posteriorly; basal patch, very broad central fascia enclosing pale median spot near posterior edge, and subapical fascia fuscous, blackish-mixed, partly edged with pale leaden-metallic striae. Hindwings light grey.

Surrey to Norfolk and Cambridge, York to Ross, local; N. and C. Europe; 7.

32. **E. irriguana**, *HS.* 15-18 mm. Forewings pale greyish-ochreous, costa spotted with dark grey; basal patch, central fascia posteriorly broadly prominent in middle, a praetornal subquadrate spot, and subapical fascia darker greyish-ochreous, more or less edged with pale leaden-metallic strigulae. Hindwings grey.

Westmoreland to Ross, local; N. and mountains of C. Europe, NW. Asia; 7.

33. **E. urticana**, *Hb.* 14-20 mm. Forewings pale ochreous or reddish-ochreous, striated with silvery-whitish, costa marked with black; basal patch with sinuate edge, central fascia posteriorly prominent and indented in middle, a praetornal spot separated from fascia by a hardly paler space, subapical fascia hardly reaching costa, and small apical spot ochreous or ferruginous, mixed with black. Hindwings grey.

Britain to the Hebrides, Ireland, common, more scarce northwards; C. Europe, Asia Minor, N. America; 7. Larva dark red-brown; head and plate of 2 black: on *Vaccinium*, *Lonicera*, birch, etc.; 5, 6.

34. **E. lacunana**, *Dup.* (*herbana*, Gn.) 15-17 mm. Forewings pale ochreous or greyish-ochreous, striated with silvery-metallic, sometimes strigulated with dark fuscous, costa marked with dark fuscous; basal patch with edge abruptly excavated below

middle, central fascia broadest dorsally and more or less interrupted by a narrow anterior indentation above middle, subapical fascia hardly reaching costa, and small apical spot sometimes confluent with it dark fuscous mixed with pale greyish-ochreous. Hindwings grey.

Britain to the Shetlands, Ireland, abundant; Europe, WC. Asia; 6, 7. Larva very variable, dark brown, blackish, grey-whitish, yellowish, or green; head and plate of 2 black or light brown: on most low plants, *Salix*, *Rubus*, etc.; 5.

35. **E. doubledayana**, *Barr.* 12-13 mm. Palpi ascending, second joint shortly scaled, terminal rather long. Forewings with costa rather strongly arched, termen little oblique; ochreous-whitish, striated with grey, costa strigulated with dark fuscous; basal patch with sinuate edge, central fascia with two sharp posterior projections, a triangular praetornal spot, and subapical fascia much narrowed costally ochreous or ferruginous-brown, mixed with black. Hindwings grey.

Norfolk and Cambridge, locally common in the fens; C. Europe; 7.

36. **E. cespitana**, *Hb.* 12-16 mm. Palpi porrected, second joint broadly scaled, terminal very short. Forewings with costa less arched than in *E. doubledayana*, termen more oblique; silvery-whitish, strigulated with ochreous, greyish-ochreous, reddish, or dark fuscous, costa black-marked; basal patch with edge angularly indented, central fascia with two sharp posterior projections, oblique praetornal spot, and triangular terminal patch ochreous or ferruginous, mixed with black or dark fuscous. Hindwings grey.

Britain to Ross, Ireland, local; C. Europe, WC. Asia; 6, 7.

37. **E. bifasciana**, *Hw.* 12-13 mm. Forewings with costa slightly arched; silvery-whitish, with pale greyish-ochreous striae, posteriorly confluent in disc, costa marked with blackish; basal patch with edge nearly straight, central fascia evenly broad and posteriorly indented below middle, and a slender terminal streak pale greyish-ochreous mixed with pale silver-grey and irrorated with black. Hindwings light grey.

England, local, amongst firs; C. Europe; 7.

38. **E. branderiana**, *L.* 21-27 mm. Forewings whitish-fuscous or fuscous; basal patch and dorsally dilated central fascia fuscous or rather dark fuscous, in darker specimens often obsolete; a dark fuscous praetornal spot touching fascia. Hindwings grey, in ♂ lighter.

England to York, Aberdeen (?), local; C. Europe; 7. Larva dull greenish; head black; plate of 2 black, anterior edge white: on aspen (*Populus tremula*); 5.

39. **E. striana,** *Schiff.* 15-20 mm. Forewings from ochreous-whitish to pale brownish, often red-tinged, strigulated throughout with fuscous; basal patch hardly darker, edge sinuate; central fascia dark fuscous, narrowed towards extremities, edges irregular; a dark fuscous subapical fascia not nearly reaching costa, and small apical spot, sometimes connected. Hindwings in ♂ pale grey, in ♀ grey.

Britain to the Clyde, N. Ireland, common; C. Europe; 6, 7. Larva yellow-whitish; head and plate of 2 pale brown: in roots of *Taraxacum;* 2-5.

40. **E. ericetana,** *Westw.* 13-19 mm. Forewings light fuscous, sometimes obscurely darker-strigulated; base obscurely darker or ferruginous-tinged; an indistinct central fascia not reaching dorsum, short transverse tornal streak, and subapical streak not reaching costa darker fuscous or ochreous-brown, obscure. Hindwings rather dark grey.

England, local; C. Europe; 6, 7. Larva in roots of *Stachys arvensis;* 2-5.

41. **E. antiquana,** *Hb.* 17-22 mm. Forewings with termen subsinuate, light brownish-ochreous, more or less sprinkled with whitish and dark fuscous; edge of basal patch fuscous, acutely angulated, not reaching dorsum; a triangular dark brown central blotch, connected with costa by a brown suffusion; a dark brown spot above tornus, and an inwards-angulated streak from apex to termen above tornus more or less connected at angle with central blotch. Hindwings grey, lighter towards base.

Britain to the Shetlands, Ireland, rather local; C. Europe; 6, 7. Larva yellow-whitish; head and plate of 2 light brown: in roots of *Stachys arvensis;* 2-5.

6. PAMPLUSIA, *Gn.*

Antennae in ♂ simple. Palpi moderately long, porrected. Thorax smooth. Forewings with termen nearly straight. Hindwings: 3 and 4 connate, 5 approximated to 4, 6 and 7 closely approximated towards base.

A genus of very few northern temperate species, derived from *Enarmonia.* Imago with forewings narrow.

Forewings white . . . . 1. *pauperana.*
" ferruginous . . . 2. *mercuriana.*

1. **P. pauperana**, *Dup.* 13-16 mm. Forewings white, irregularly grey-sprinkled; basal patch large, dark grey, black-marked, edge oblique, bent, reaching on dorsum to middle; central fascia forming a grey costal spot and irregular black-marked tornal blotch; costa spotted with grey posteriorly; a transverse subapical series of black marks; cilia blackish-grey, on tornus white. Hindwings light grey, apex darker.

Kent, Surrey, Essex, Cheshire, Lancashire, local; C. and SW. Europe; 3, 4. Said to frequent *Rosa.*

2. **P. mercuriana**, *Hb.* (*monticolana*, Wilk.) 11-13 mm. Forewings very narrow, ferruginous; basal patch with edge very oblique, central fascia, and terminal fascia furcate on costa rather dark ferruginous-fuscous, edged with leaden-metallic striae becoming whitish on costa. Hindwings grey.

Hereford to the Shetlands, N. Ireland, common; N. and mountains of C. Europe; 7. Larva grey-green; head pale brown; plate of 2 grey: on *Dryas* and *Calluna;* 9-6.

7. Evetria, *Hb.*

Antennae in ♂ shortly ciliated. Palpi moderately long, porrected. Thorax smooth. Forewings with termen straight; 4 and 5 connate. Hindwings: 3 and 4 stalked, 5 approximated to 4, 6 and 7 stalked or closely approximated towards base.

A small northern temperate genus; all the larvae feed in shoots or bark of *Pinus.* The species are doubtless often transferred from place to place with young trees.

1.	Ground of forewings ferruginous throughout	2.
	,, ,, not ferruginous throughout	4.
2.	Forewings ferruginous-brownish	3.
	,, ferruginous-orange or red	1. *buoliana.*
3.	Striae grey-whitish, narrow	2. *pinivorana.*
	,, leaden-metallic, broad	6. *retiferana.*
4.	Apical area ferruginous	5.
	,, ,, not ferruginous	4. *resinella.*
5.	Thorax ferruginous	3. *turionana.*
	,, grey	6.
6.	Forewings with four dark fasciae	5. *duplana.*
	,, ,, two dark fasciae	7. *sylvestrana.*

1. **E. buoliana**, *Schiff.* (*pinicolana*, Dbld.) 17-22 mm. Forewings ferruginous-orange, often partly suffused with dark red; several irregular variable anastomosing metallic grey-whitish striae and costal strigulae. Hindwings light grey.

England, Moray, common; Europe, WC. and N. Asia; 7, 8.

Larva brown-reddish; head and plate of 2 black: in shoots of *Pinus sylvestris;* 4, 5.

2. **E. pinivorana,** *Z.* 15-20 mm. Forewings brownish-ferruginous, sometimes sprinkled with dark fuscous, costa and dorsum dark fuscous; numerous irregular variable anastomosing shining grey-whitish striae. Hindwings grey.

Britain to Caledonian Canal, N. and W. Ireland, common; N. and C. Europe, N. America; 6, 7. Larva in shoots of *Pinus sylvestris;* 4, 5.

3. **E. turionana,** *Hb.* 18-21 mm. Head and thorax light ferruginous. Forewings dark fuscous, with numerous thick striae of pale leaden-metallic irroration; apical third suffused with ferruginous. Hindwings in ♂ grey-whitish, apical third grey, in ♀ greyer throughout; apex often mixed with light ferruginous.

England (except WC. and SW.), Scotland to Perth, local; C. Europe, N. America; 6. Larva brown; head black: in shoots of *Pinus picea* and *P. sylvestris;* 3, 4.

4. **E. resinella,** *L.* 15-22 mm. Forewings dark fuscous, very finely striated with whitish; numerous thick irregular variable leaden-metallic striae, posteriorly rising from white costal strigulae. Hindwings fuscous, darker posteriorly.

York to Caledonian Canal, local; N., C.; and SW. Europe; 6. Larva deep yellowish; head light brown: in bark and resin of *Pinus sylvestris;* 8-4 (sometimes living two years).

5. **E. duplana,** *Hb.* 13-16 mm. Head and thorax light grey, face more or less ferruginous-tinged. Forewings with apex more pointed, termen more oblique than in *E. turionana;* dark fuscous, finely striated with whitish, forming lighter spaces alternating with four more or less distinct darker fasciae; apical area suffused with bright ferruginous. Hindwings light fuscous, darker towards apex.

Moray (other records doubtful), local; C. and SW. Europe; 5. Larva in shoots of *Pinus sylvestris;* 6, 7.

6. **E. retiferana,** *Wk.* (*margarotana,* Hein., non HS.) 15-20 mm. Head ferruginous. Forewings ferruginous-brown, with numerous broad purplish-leaden-metallic blackish-edged striae; costa with whitish strigulae posteriorly. Hindwings pale fuscous, darker posteriorly.

Scotland (locality unrecorded), probably scarce and local; Germany; 5. Larva in shoots of *Pinus abies;* 6, 7.

7. **E. sylvestrana,** *Curt.* 11-14 mm. Head and thorax grey, whitish-sprinkled. Forewings narrow, dark fuscous, with

numerous thick obscure leaden-metallic striae; straight edge of basal patch and vertical postmedian fascia darker; apical area suffused with ferruginous. Hindwings fuscous.

Kent to Dorset and Hereford, local; Germany, N. America; 6, 7. Larva dull reddish-brown; head black; plate of 2 dark brown: in shoots of *Pinus sylvestris;* 4, 5.

8. ASTHENIA, *Hb.*

Antennae in ♂ biciliated with very long fascicles (4). Palpi moderately long, porrected. Thorax smooth. Forewings with termen slightly rounded. Hindwings: 3 and 4 stalked, 5 approximated to 4, 6 and 7 closely approximated towards base.

Includes only the single species.

1. **A. pygmaeana,** *Hb.* 11-12 mm. Forewings fuscous, whitish-sprinkled, costa spotted with dark fuscous; basal patch with edge sharply angulated, and central fascia darker, space between them forming a subquadrate more whitish dorsal spot; ocellus large, broadly edged with leaden-metallic. Hindwings white; apical third fuscous, darker terminally.

Surrey, Norfolk, local; C. Europe; 4. Larva green; spots black; head and plate of 2 black: on *Pinus abies;* 6, 7.

9. ENARMONIA, *Hb.*

Antennae in ♂ moderately or shortly ciliated. Palpi moderately long, porrected. Thorax smooth or with slight crest. Forewings with termen straight. Hindwings: 3 and 4 stalked, 5 approximated to 4, 6 and 7 closely approximated towards base.

A northern temperate genus of moderate extent, derived from *Cydia.*

1.	Edge of basal patch straight, oblique	1. *cruciana.*
	,, ,, more or less angulated	2.
2.	Edge of basal patch angulated below middle	3.
	,, ,, in or above middle	5.
3.	Forewings clear white	2. *simplana.*
	,, irrorated with dark fuscous	4.
4.	Central fascia interrupted below middle	11. *oppressana.*
	,, entire	5. *nanana.*
5.	Edge of basal patch acutely angulated	6.
	,, ,, obtusely angulated	10.
6.	Central fascia interrupted in middle	12. *woeberiana.*
	,, entire	7.

7. Central fascia ferruginous-ochreous towards dorsum 9. *ratzeburgiana.*
„ not ferruginous-ochreous towards dorsum . . . 8.
8. Head and thorax ferruginous-ochreous . 7. *rufimitrana.*
„ not ferruginous-ochreous . 9.
9. Central fascia obtusely angulated near dorsum 10. *corticana.*
„ straight . . . 6. *pinicolana.*
10. Forewings with ferruginous apical patch 3. *rubiginosana.*
„ without ferruginous apical patch . 11.
11. Central fascia and edge of basal patch darker dorsally 4. *quadrana.*
„ „ „ not darker dorsally 8. *vacciniana.*

1. **E. cruciana**, *L.* (*augustana*, Hb.) 13-15 mm. Forewings from light greyish-ochreous to ochreous-whitish, with a few black scales; basal patch slightly darker, more fuscous dorsally, edge straight, oblique; central fascia and broad terminal fascia deep ferruginous, sometimes mixed with dark fuscous, confluent on lower half, enclosing a pale triangular costal spot sometimes edged with silvery-metallic and on costa with white. Hindwings dark fuscous, lighter anteriorly.

Britain to the Orkneys, Ireland, common; N. and C. Europe, N. America; 6, 7. Larva pale yellow; head light brown; plate of 2 yellow or pale brownish: on *Salix caprea* and *S. repens*; 5.

2. **E. simplana**, *F.R.* 12-13 mm. Face clear white. Forewings narrow, white, partly suffused with whitish-ochreous, costa and dorsum strigulated with black; basal patch dark ashy-fuscous, black-marked, edge angulated below middle, extreme base whitish; a spot on middle of costa, and a smaller one on dorsum at $\frac{2}{3}$ dark grey, black-marked; an interrupted black terminal line. Hindwings grey.

Kent, Cambridge, local; Germany, Switzerland; 5, 6. Larva on aspen (*Populus tremula*); 7 (?).

3. **E. rubiginosana**, *HS.* (*bouchardana*, Dbld.) 13-15 mm. Forewings elongate, costa nearly straight; dark grey, irrorated with whitish, costa posteriorly spotted with black and white, a fascia limiting basal patch with slight posterior median projection, and central fascia suffused with ferruginous, black-marked, space between them white towards dorsum; a clear ferruginous triangular apical patch, including a grey stria, and several black dashes near anterior edge. Hindwings fuscous, darker posteriorly.

Kent, Norfolk, York, Scotland to Caledonian Canal, amongst firs, local; Holland, Germany; 6.

4. **E. quadrana,** *Hb.* 13-15 mm. Forewings elongate, costa almost straight; whitish-grey, striated with dark fuscous, costa posteriorly spotted with dark fuscous; edge of basal patch obtusely angulated in middle, slender dorsally dilated central fascia, and irregular spot before termen in middle rather dark fuscous, distinctly darker dorsally. Hindwings grey, beneath much suffused with whitish.

Kent, Sussex, Surrey, Lancashire, Westmoreland, I. of Man, local; N. and C. Europe; 5.

5. **E. nanana,** *Tr.* 9-11 mm. Head pale brownish-ochreous, face whitish. Forewings with costa gently arched, lighter or darker fuscous, whitish-sprinkled, costa strigulated with dark fuscous and white; edge of basal patch obtusely angulated below middle, central fascia with posterior median projection, and transverse streak before apex dark fuscous. Hindwings rather dark fuscous.

England, common; C. Europe; 6, 7. Larva brown; head and plate of 2 black: on *Pinus abies;* 5.

6. **E. pinicolana,** *Z.* (*occultana,* Wilk.) 17-22 mm. Forewings very elongate, ochreous-grey, irrorated with whitish, and mixed with blackish or dark fuscous, forming indistinct darker strigulae; basal patch with edge acutely angulated in middle, central fascia, and indistinct subapical suffusion darker. Hindwings fuscous, darker posteriorly.

Britain to the Clyde, rather common; N. and mountains of C. Europe, N. Asia; 7. Larva dark grey-green or grey; head, plate of 2, and tubercular spots black: on larch; 5, 6.

7. **E. rufimitrana,** *HS.* 12-14 mm. Head and thorax ferruginous-ochreous. Forewings with costa moderately arched, brown, more or less ferruginous-tinged, striated with shining grey-whitish; basal patch with edge sharply angulated in middle, rather irregular central fascia, and a spot in disc towards apex mixed with dark fuscous; three small spots on costa posteriorly, and an apical spot dark fuscous. Hindwings fuscous, darker posteriorly.

Norfolk, Cambridge, local; C. Europe; 7. Larva whitish-green or dull greenish-yellow; head yellow-brown or red-brown; plate of 2 yellowish or greenish: on *Pinus cephalonica;* 5. This species must of course have been introduced with its food-plant.

8. **E. vacciniana,** *Z.* 8-10 mm. Forewings with costa

slightly arched, whitish-fuscous, darker-sprinkled, costa strigulated with dark fuscous and posteriorly with whitish; basal patch partially dark fuscous, edge obtusely angulated above middle; obtusely angulated central fascia, and irregular transverse streak before apex dark fuscous. Hindwings dark fuscous.

England, Aberdeen, E. Ireland, local; N. and C. Europe; 5, 6. Larva reddish-grey; head brown: on *Vaccinium myrtillus*; 7, 8.

9. **E. ratzeburgiana**, *Rtz.* (*tenerana*, Dup.) 12-15 mm. Forewings with costa moderately arched, ferruginous-ochreous, more or less sprinkled with grey and whitish, costa spotted with blackish; edge of basal patch blackish-mixed, sharply angulated in middle, almost touching central fascia to enclose a somewhat paler triangular dorsal spot; central fascia black-marked on upper half. Hindwings grey.

Britain to Caledonian Canal, local; C. Europe, N. America; 7. Larva light yellowish-green; head yellowish-brown: on *Pinus abies*; 5.

10. **E. corticana**, *Hb.* 13-17 mm. Forewings with costa moderately arched, whitish, ochreous, or fuscous, sprinkled and strigulated with dark fuscous or blackish, sometimes wholly suffused with dark fuscous; basal patch darker, black-marked, often abruptly whitish on dorsum, edge sharply angulated, touching central fascia to include a trapezoidal usually paler or white dorsal spot; central fascia and a subapical suffusion fuscous or dark fuscous, black-marked. Hindwings grey.

Britain to the Hebrides, N. and E. Ireland, very common, often excessively abundant; Europe; 7, 8. Larva pale brownish-ochreous; head light brown; tubercular spots small, black: on oak; 5, 6. The imago sits on the trunks, to which its colouring is adapted.

11. **E. oppressana**, *Tr.* 13-15 mm. Forewings with costa moderately arched, white, more or less densely irrorated with dark grey, and strigulated on margins with blackish; basal patch with edge obtusely angulated below middle, central fascia interrupted near dorsum, a subterminal spot in middle, and small apical spot darker, partly suffused with brown, and marked with black. Hindwings grey.

Kent to Hereford and Norfolk, Westmoreland, local; C. Europe; 6, 7. Larva pale brown; head and plate of 2 black: in buds of black poplar (*Populus nigra*); 3-5. The imago sits on the trunks.

12. **E. woeberiana**, *Schiff.* 13-17 mm. Forewings with costa moderately arched, ferruginous-ochreous, with leaden-metallic striae; costa blackish, posteriorly strigulated with white; basal patch with edge sharply angulated in middle and indented near dorsum, and central fascia interrupted in middle dark fuscous, marked with ferruginous-ochreous; ocellus black, edged with leaden-metallic and streaked with ferruginous, surmounted by a dark fuscous curved mark. Hindwings rather dark fuscous.

Britain to the Clyde, N. Ireland, common; C. Europe, N. Asia; 6, 7. Larva rosy-whitish: in bark of apple, plum, cherry, etc.; 9-4.

10. TMETOCERA, *Ld.*

Antennae in ♂ shortly ciliated, with a deep notch above towards base. Palpi moderate, porrected. Thorax smooth. Forewings with termen hardly sinuate. Hindwings: 3 and 4 stalked, 5 approximated to 4, 6 and 7 closely approximated towards base.

Only contains the single species; a development of *Cydia.* It forms one of a small group of genera with similarly notched antennae, which attains some development in Australia.

1. **T. ocellana**, *F.* (*lariciana*, Z.) 12-15 mm. Forewings whitish, sometimes partly suffused with grey, more or less strigulated with dark fuscous; basal patch dark grey, sometimes blackish-mixed, edge somewhat angulated; central fascia forming a dark grey sometimes indistinct costal suffusion, and black-edged triangular praetornal spot; ocellus edged with leaden-metallic, enclosing several sometimes confluent black dashes; cilia dark grey. Hindwings rather dark grey.

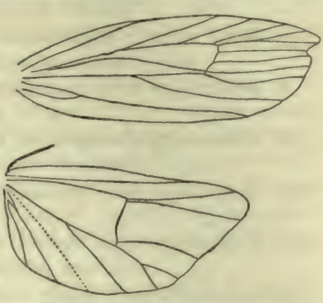
England, common; C. and SW. Europe, N. America; 7, 8. Larva pinkish-brown; head and plate of 2 dark fuscous: on blackthorn, larch, alder, etc.; 5. The larch-feeding form distinguished as *lariciana* is usually somewhat smaller and darker.

11. EUDEMIS, *Hb.*

Antennae in ♂ minutely ciliated. Palpi moderately long, porrected. Thorax smooth. Forewings with termen abruptly sinuate; 7 and 8 stalked. Hindwings: 3 and 4 stalked, 5 approximated to 4, 6 and 7 closely approximated towards base.

Also restricted to a single species, correlated with the preceding.

1. **E. naevana**, *Hb.* (*geminana*, Stph.) 11-14 mm. Forewings grey, often obscurely striated or suffused with whitish; large basal patch with edge angulated, and anteriorly suffused central fascia with posterior median projection suffusedly dark fuscous, sometimes black-marked; some small dark fuscous spots on costa posteriorly, and a suffused streak beneath them from apex; ocellus broadly edged with light metallic-grey. Hindwings grey; in ♂ beneath suffused with black towards costa.



Neuration of *Eudemis naevana.*

Britain to the Clyde, N. and E. Ireland, common; N. and C. Europe, N. America (?); 7, 8. Larva light grey-green, sides more yellowish; head black or blackish-brown; plate of 2 black: on blackthorn, holly, *Vaccinium*, etc.; 5, 6. The *Vaccinium*-feeding form has been distinguished under the name *geminana*, but there is no constant difference.

12. Ancylis, *Hb.*

Antennae in ♂ shortly ciliated. Palpi moderately long, porrected. Thorax smooth. Forewings with apex falcate, acute. Hindwings: 3 and 4 stalked or coincident, 5 approximated to 4, 6 and 7 closely approximated towards base.

A genus of moderate extent, more numerous in N. America than in Europe, hardly found elsewhere.

1. 3 and 4 of hindwings coincident . . . 2.
„ „ stalked . . . 6.
2. Forewings with dark fuscous median longitudinal streak . . . 5. *siculana.*
„ without such streak . . . 3.
3. Central fascia distinct throughout . 4. *myrtillana.*
„ „ dorsally obsolete . . . 4.
4. Pale band before fascia centrally grey . 1. *derasana.*
„ „ „ „ wholly whitish . . 5.
5. Forewings with three black dots at base of cilia 3. *paludana.*
„ without such dots . . 2. *lundana.*
6. Forewings with sinuate whitish longitudinal line 7.
„ without such line . . . 9.

7. Longitudinal line twice arched . . . 8.
„ „ once arched, thence nearly straight 11. *diminutana.*
8. Head white ; subcostal dots round 10. *inornatana.*
„ pale pinkish-ochreous ; dots elongate 9. *biarcuana.*
9. Forewings with costal half mostly white . 14. *lactana.*
„ „ „ „ not white . . 10.
10. Forewings almost wholly dark fuscous . 13. *upupana.*
„ not dark fuscous . . . 11.
11. Forewings with ground-colour ferruginous . 12.
„ „ „ not ferruginous . 13.
12. Forewings with whitish dorsal blotches . 8. *uncana.*
„ without whitish blotches 12. *mitterbacheriana.*
13. Central fascia dorsally obsolete, projection long 6. *comptana.*
„ „ entire, projection short 7. *unguicella.*

Section A. 3 and 4 of hindwings coincident.

1. **A. derasana**, *Hb.* 14-16 mm. Forewings deep ferruginous, darker and browner anteriorly ; costa posteriorly strigulated with grey and whitish ; a thick grey streak, mixed and basally suffused with ochreous-whitish, from base along costa to before middle, thence straight to dorsum before tornus, where it joins the grey whitish-edged ocellus. Hindwings grey.

Britain to the Clyde, rather local, scarcer northwards ; C. Europe ; 6, 7. Larva greyish-ochreous or olive-green ; head light brown ; plate of 2 light brown, black-spotted : on *Rhamnus catharticus ;* 9.

2. **A. lundana**, *F.* 12-17 mm. Forewings deep golden-ochreous, costa posteriorly blackish strigulated with whitish ; a broad ochreous-whitish streak from base along costa to before middle, thence slightly curved to dorsum before tornus, enclosing a dark fuscous semioval blotch ; central fascia ferruginous mixed with black, with acute posterior median projection, not reaching dorsum, followed by a leaden-metallic stria ; tornal area often black-mixed ; some leaden anteapical dots. Hindwings grey.

Britain to the Clyde, Ireland, very common ; N. and C. Europe, WC. Asia to N. Persia, N. America ; 5, 8. Larva light greenish-grey ; head and plate of 2 pale ochreous, blackish-marked : on *Vicia*, *Lathyrus*, etc ; 6, 9.

3. **A. paludana**, *Barr.* 11-13 mm. Differs from *A. lundana* as follows : forewings paler and sometimes whitish-sprinkled

throughout, central fascia with projection stronger, following stria wholly whitish, three minute blackish dots at base of cilia on middle of termen; hindwings sometimes paler.

Norfolk, Cambridge, in fens, locally plentiful; Germany; 6, 8. Larva probably on *Lathyrus*.

4. **A. myrtillana**, *Tr.* 11-14 mm. Forewings ochreous or pale brownish, sometimes striated with whitish, costa posteriorly spotted with dark fuscous; a rather dark fuscous irregularly triangular dorsal blotch extending from base to beyond middle, surrounding space sometimes wholly whitish; central fascia ochreous-brownish, with wedge-shaped posterior projection upwards from below middle, marked with one or two black dashes in middle. Hindwings grey.

Britain to the Orkneys, N. and E. Ireland, local; N. and C. Europe; 6. Larva on *Vaccinium myrtillus*; 7, 8.

5. **A. siculana**, *Hb.* 14-16 mm. Forewings fuscous-whitish, sprinkled with fuscous, costa strigulated with dark fuscous except towards base; a clear whitish median longitudinal streak from base to beyond middle, edged beneath by a suffused rather dark fuscous streak running to apex but obliquely interrupted beyond middle, suffusedly connected with tornus before interruption; costal extremity of central fascia dark fuscous. Hindwings grey.

Britain to Caledonian Canal (except WC. and SW. England), S. Ireland, local; N. and C. Europe; 5, 6. Larva on *Myrica*; 7, 8.

Section B. 3 and 4 of hindwings stalked.

6. **A. comptana**, *Fröl.* 10-12 mm. Forewings rather dark grey, sometimes whitish-mixed, beneath costa posteriorly sometimes ferruginous, costa posteriorly blackish strigulated with whitish; large basal patch with edge obliquely rounded and less marked towards costa, and central fascia with acute posterior median projection, not reaching dorsum, dark fuscous, often very indistinct; sometimes one or two black marks near tornus. Hindwings grey.

England to Cheshire, rather local, especially on chalk downs; C. Europe, N. America; 5, 6, 8. Larva on *Potentilla*; 7, 9.

7. **A. unguicella**, *L.* 14-17 mm. Forewings whitish, sprinkled or sometimes suffused with light fuscous, more or less striated with brown, costa strigulated with dark fuscous and whitish; basal patch with edge obliquely rounded and less marked towards costa, narrow central fascia with short posterior

median projection, and a subapical transverse streak triangularly dilated towards termen ochreous-fuscous or dark fuscous Hindwings grey.

Britain to the Shetlands, N. Ireland, rather local; N. and C. Europe; 5, 6. Larva on *Erica;* 7, 8.

8. **A. uncana**, *Hb.* 15-19 mm. Forewings deep ferruginous, sometimes blackish-sprinkled; costa anteriorly suffused with light grey, strigulated throughout with black and posteriorly with white; dorsum blackish-dotted; a triangular median dorsal blotch, and a round tornal blotch with anterior edge strongly indented suffusedly whitish. Hindwings grey.

Britain to Sutherland, N. Ireland, local; N. and C. Europe, N. America; 5, 6. Larva on *Erica* and birch; 7, 8.

9. **A. biarcuana**, *Stph.* 14-16 mm. Head pale pinkish-ochreous. Forewings red-brownish, more or less streaked with blackish in disc posteriorly; costa strigulated and anteriorly broadly suffused with whitish; two or three elongate black subcostal dots towards base; dorsal area suffused with whitish, limited by a whitish line forming a subtriangular projection in middle and a flat arch posteriorly, ending on termen above middle. Hindwings light grey.

Britain to Sutherland, W. Ireland, local; C. Europe, N. America; 6, 7. Larva on *Salix caprea;* 8.

10. **A. inornatana**, *HS.* (*subarcuana*, Wilk.) 13-15 mm. Differs from *A. biarcuana* as follows: head white, forewings slightly narrower, ground-colour ochreous or grey, subcostal dots round, posterior arch of white line more rounded and ending lower on termen.

England, local; C. Europe; 5, 6, 8. Larva on *Salix caprea;* 7, 9.

11. **A. diminutana**, *Hw.* 13-15 mm. Forewings deep ferruginous, towards costa strigulated with grey and basally suffused with light grey or whitish; two or three black subcostal dots towards base; dorsal area suffused with whitish, limited by a whitish line forming a rounded triangular projection in middle, thence nearly straight to termen below apex. Hindwings grey.

England, rather local; C. Europe; 5, 6. Larva on *Salix caprea;* 7.

12. **A. mitterbacheriana**, *Schiff.* 13-16 mm. Forewings ferruginous, costa strigulated with black and posteriorly with white; a subquadrate dark ferruginous-brown dorsal blotch reaching from base to middle, posteriorly whitish-edged; a thick

very oblique deep ferruginous streak from middle of costa, sometimes reaching termen beneath apex. Hindwings rather dark grey.

Britain to the Clyde, Ireland, common; C. Europe; 5, 6. Larva dull green; head and plate of 2 yellow-brownish, blackish-marked: on oak; 7-9.

13. **A. upupana**, *Tr.* 14-19 mm. Forewings dark fuscous; a ferruginous costal patch reaching from beyond middle to apex, costa within this strigulated with dark fuscous and whitish; an angulated posterior leaden-metallic stria. Hindwings dark fuscous, lighter anteriorly.

Kent to Sussex and Suffolk, local; C. Europe; 5, 6. Larva brownish-green; head and plate of 2 black: on birch; 7-9.

14. **A. lactana**, *F.* (*harpana*, Hb.; *ramana*, Fröl.) 13-17 mm. Forewings grey, strigulated and spotted with black; costal half white from base to $\frac{2}{3}$, with an irregular median projection; costa strigulated with black and posteriorly with white; two or three black subcostal dots towards base; a ferruginous apical spot; ocellus mostly leaden-metallic, on termen edged with white. Hindwings grey, apex darker, in ♂ whitish anteriorly, in ♀ paler grey.

England, local; C. Europe; 6. Larva yellow-whitish; spots black; head black; plate of 2 brown, black-marked: on poplar and aspen; 7-9.

13. GYPSONOMA, *n.g.*

Antennae in ♂ shortly ciliated. Palpi moderate, ascending. Thorax smooth. Forewings with termen sinuate. Hindwings: 3 and 4 stalked, 5 approximated to 4, 6 and 7 stalked.

Contains only a few northern temperate species.

1. A strong black costal mark on central fascia 2. *neglectana.*
   No black costal mark on central fascia . . 2.
2. A blackish spot before middle of termen . 3. *aceriana.*
   No blackish spot before middle of termen 1. *dealbana.*

1. **G. dealbana**, *Fröl.* (*incarnana*, Hw.) 12-15 mm. Face grey-whitish. Forewings whitish, sometimes much mixed or suffused with grey, costa strigulated with blackish; basal patch dark grey, mixed with black, edge angulated; central fascia grey, undefined, near costa brownish, with a black mark in disc; ocellus edged with leaden-metallic; a transverse grey subapical streak, followed by a leaden-metallic stria; apex dark fuscous, sometimes ferruginous-tinged. Hindwings grey, darker posteriorly.

England to York, very common; N. and C. Europe, N. America; 7. Larva whitish or pale flesh-colour; spots brown; head brown: on oak, poplar, *Salix*, etc.; 5, 6.

2. **G. neglectana**, *Dup.* 12-15 mm. Face clear white. Forewings ochreous-white, disc more ochreous-tinged, with a few black scales; costa strigulated with black; basal patch dark fuscous, whitish-mixed, much marked with black, edge angulated; central fascia grey, black-marked, more or less interrupted near dorsum, on costa dilated and with a strong black mark; some leaden-metallic and dark grey posterior striae; apex ferruginous. Hindwings rather dark grey.

Britain to Caledonian Canal, local; Germany; 7. Larva on *Salix alba* and aspen; 5.

3. **G. aceriana**, *Dup.* 14-15 mm. Face whitish-fuscous. Forewings ochreous-whitish, more or less sprinkled and posteriorly suffused with pale brownish, costa obscurely strigulated with blackish; basal patch fuscous marked with blackish, edge obtusely or hardly angulated; central fascia fuscous, ill-defined, more or less interrupted near dorsum, with small blackish mark in disc; some dots round ocellus, an irregular spot touching middle of termen, and small apical spot blackish. Hindwings grey.

England to Lancashire, local; C. and SW. Europe; 7. Larva dull brownish; head reddish-brown; plate of 2 black: in shoots, leaf-stalks, and bark of poplar; 5.

14. CYDIA, *Hb.*

Antennae in ♂ shortly ciliated. Palpi moderately long, porrected. Thorax smooth. Forewings with termen sinuate. Hindwings: 3 and 4 stalked or connate or coincident, 5 approximated to 4, 6 and 7 closely approximated towards base.

A northern temperate genus of considerable extent, derived from *Epinotia*.

1. Forewings with ground-colour white . . 2.
" " not white . . 6.
2. Ocellus suffused with black . 11. *nigromaculana.*
" not suffused with black . . . 3.
3. Ocellus with distinct black dots . . . 4.
" without black dots . . . 5.
4. Edge of basal patch formed by a straight fascia 14. *pupillana.*
" " by discal and dorsal spots 13. *candidulana.*

5. Forewings with two blackish triangular dorsal spots . . . . 4. *ramella.*
,, without such spots . 2. *trimaculana* (part).
6. Forewings pale yellow . . . 12. *citrana.*
,, not yellow . . . . 7.
7. Ocellus enclosing distinct black dashes . . 8.
,, without black dashes . . . 13.
8. Forewings striated with red-brown . . 3. *minutana.*
,, not striated with red-brown . . 9.
9. Hindwings white . . . . 9. *subsequana.*
,, not white . . . . 10.
10. Basal patch distinctly blackish-striated . 15. *aemulana.*
,, not blackish-striated . . . 11.
11. Forewings with disc somewhat streaked longitudinally . 17. *aspidiscana.*
,, ,, not streaked longitudinally . 12.
12. Ocellus ochreous-whitish . . 18. *conterminana.*
,, not whitish . . . 16. *tripoliana.*
13. Edge of basal patch rounded, very oblique 1. *obtusana.*
,, ,, more or less angulated . 14.
14. Forewings with black discal streak posteriorly 5. *signatana.*
,, without such streak . . . 15.
15. Central fascia bent . . . 10. *fractifasciana.*
,, ,, not bent . . . . 16.
16. Forewings marked with ochreous or ferruginous . 17.
,, not so marked . . . 18.
17. Central fascia obliquely cut above middle 6. *achatana.*
,, ,, entire . . 2. *trimaculana* (part).
18. Markings edged with leaden-metallic . 8. *strobilella.*
not metallic-edged . 7. *ustomaculana.*

1. **C. obtusana,** *Hw.* 10-12 mm. Forewings ferruginous, costa with dark fuscous and whitish strigulae; basal patch dark ferruginous-brown except towards costa, edge rounded, very oblique, reaching beyond middle of dorsum, followed by a grey-whitish stria broadly enlarged on costa; central fascia dark ferruginous-brown, with strong posterior median projection, not reaching dorsum; costal area beyond this dark ferruginous; ocellus small, broadly edged with leaden-metallic. Hindwings fuscous, darker terminally.

England, rather local; C. Europe, WC. Asia to N. Persia; 6.

2. **C. trimaculana,** *Don.* 13-15 mm. Palpi whitish, towards tips grey. Forewings from white to ochreous, sometimes with

dark fuscous strigulae; costa with dark fuscous and pale or white strigulae; basal patch with edge angulated in middle, central fascia dilated dorsally, and an irregular spot before termen in middle usually more or less ochreous and much striated or suffused with dark fuscous, in ochreous specimens sometimes obsolete; apical area ochreous; margins of ocellus and sometimes two streaks from costa posteriorly leaden-metallic. Hindwings grey.

Britain to Caledonian Canal, E. Ireland, very common; C. and SW. Europe; 6, 7. Larva pale greenish or yellowish, more brownish above; head and plate of 2 black: on elm; 5, 6.

3. **C. minutana,** *Hb.* 12-15 mm. Palpi ochreous-whitish, above grey. Forewings whitish-ochreous, much tinged with rosy-purplish, striated with red-brown, mixed with black; angulated edge of basal patch and irregular central fascia more black-marked; some streaks from costa posteriorly and margins of ocellus obscurely golden-metallic; ocellus including several blackish dashes. Hindwings grey, darker posteriorly.

Kent and Surrey to Norfolk, Lancashire, local; C. and S. Europe, N. Africa; 7. Larva green; head and plate of 2 dark brown: on poplar; 5.

4. **C. ramella,** *L.* (*paykulliana,* Wilk.) 13-16 mm. Forewings ochreous-white, with some black scales towards base; costa greyish-tinged, strigulated with black; a triangular black spot mixed with grey on dorsum before middle, and another less defined on tornus; central fascia ill-marked, pale ochreous-grey; apex suffused with dark grey; ocellus edged with leaden-metallic; sometimes dorsal $\frac{3}{5}$ of wing wholly suffused with blackish-grey. Hindwings grey.

Britain to Ross, rather common; C. Europe; 7, 8. Larva on birch; 5, 6.

5. **C. signatana,** *Dgl.* 14-16 mm. Forewings yellow-whitish striated with fuscous, costa strigulated with dark fuscous; basal patch with edge angulated in middle, irregular central fascia, and apical area fuscous irrorated with pale yellowish, with a few blackish marks; a slender blackish longitudinal streak crossing middle of fascia and curved upwards above ocellus to near termen; ocellus pale yellowish, edged with leaden-metallic. Hindwings grey or light grey.

England, N. Ireland, local; C. Europe; 7. Larva on *Prunus padus* and probably *P. cerasus;* 5.

6. **C. achatana,** *F.* 13-17 mm. Forewings fuscous, with

thick subconfluent pale leaden-metallic striae, costa posteriorly strigulated with whitish; basal patch dark fuscous, mixed with leaden-metallic, edge bent; central fascia dark fuscous, ferruginous-mixed, sharply obliquely interrupted with leaden-metallic above middle; a triangular apical ferruginous-orange patch, sprinkled with dark fuscous and cut by a leaden-metallic stria. Hindwings grey.

S. England to Hereford and Norfolk, local; C. and SW. Europe; 6, 7. Larva blackish; head and plate of 2 black: on hawthorn and blackthorn; 5.

7. **C. ustomaculana,** *Curt.* 11-13 mm. Forewings shining ashy-grey, costa and dorsum strigulated with dark fuscous; basal patch with edge angulated, central fascia narrowed at extremities and often connected in disc with basal patch, and an irregular subapical spot connected by streaks with costa and tornus dark fuscous. Hindwings fuscous.

Merioneth, York to Ross, rather local; NC. Europe; 6, 7. Larva whitish; head and plate of 2 pale brownish-ochreous: on *Vaccinium vitis-idaea*; 4, 5.

8. **C. strobilella,** *L.* 10-13 mm. Forewings dark fuscous, irrorated with pale yellowish, costa posteriorly strigulated with whitish; basal patch with edge angulated, and narrow central fascia darker, margined with leaden-metallic striae interrupted in middle; some streaks from costa posteriorly, and posterior edge of ocellus leaden-metallic. Hindwings rather dark fuscous; cilia whitish except base.

Britain to Ayr, local; N. and C. Europe; 5. Larva pale yellowish; head and plate of 2 pale brownish: in cones of *Pinus abies*; 7-4.

9. **C. subsequana,** *Hw.* (*abiegana*, Dup.; *pygmaeana*, Wilk., non Hb.) 11-12 mm. Forewings fuscous, posteriorly ferruginous-tinged, costa strigulated with whitish and dark fuscous; basal patch with edge obtusely angulated, and central fascia dilated in disc mixed with dark fuscous: ocellus edged with leaden-metallic, including several black dashes. Hindwings white; base, veins, termen, and an apical patch grey.

Kent, Norfolk, local; Germany, Italy; 4. Larva yellowish-green; head and plate of 2 black: on *Pinus abies*; 6, 7.

10. **C. fractifasciana,** *Hw.* 11-14 mm. Forewings narrow, costa slightly arched; whitish-grey, closely irrorated and striated with dark brown; costa posteriorly strigulated with white; a bent fascia limiting basal patch, narrow bent central fascia, and one or two posterior streaks dark brown, sometimes ferruginous-

tinged; ocellus obscurely edged with leaden-metallic. Hindwings grey.

England, local; C. Europe; 5, 8. Larva grey; head ochreous: in flower-heads of *Scabiosa;* 7, 9.

11. **C. nigromaculana**, *Hw.* 14-17 mm. Forewings white, with a few scattered dark fuscous strigulae; costa strigulated with dark fuscous, posteriorly spotted with ferruginous; edge of basal patch forming a mark on costa and an erect black and fuscous dorsal spot; central fascia ferruginous mixed with black, angulated, widely interrupted above middle; ocellus suffused with black, edged with silvery-leaden-metallic; apex ferruginous, with two leaden-metallic streaks. Hindwings grey, in ♂ more or less whitish-suffused anteriorly.

Britain to the Clyde, Ireland, local; C. Europe; 6, 7. Larva on *Senecio jacobaea* (?), perhaps in the root.

12. **C. citrana**, *Hb.* 18-20 mm. Forewings pale ochreous-yellow, with faint darker strigulae, costa anteriorly dotted with blackish, posteriorly spotted with brown; an ochreous-brown dorsal mark before middle, a streak from near costa at $\frac{1}{4}$ to dorsum before tornus, and a very irregular central fascia confluent with this at tornus, and connected in middle by a straight streak with apex; ocellus obscurely metallic-edged, including two or three black dots. Hindwings grey, in ♂ paler anteriorly.

Kent and Sussex to Norfolk, Lancashire, local; C. Europe, WC. Asia to N. Persia; 7. Larva in flowers of *Artemisia campestris* and sometimes *Achillea millefolium;* 9.

13. **C. candidulana**, *Nolck.* (*wimmerana*, Wilk., non Tr.) 15-16 mm. Forewings white, disc and dorsum tinged with greyish-ochreous; costa posteriorly strigulated with fuscous, with a few black scales; edge of basal patch represented by dark fuscous triangular discal and smaller dorsal spots; narrow central fascia and a streak from its middle to apex brownish; ocellus edged with silvery-metallic, including two or three linear black dots. Hindwings grey, in ♂ paler anteriorly.

Kent, Essex, local; NC. Europe; 7. Larva whitish; narrow dorsal and broad subdorsal stripes dull purplish; head brown; plate of 2 brown, anteriorly whitish: on flowers of *Artemisia maritima;* 9.

14. **C. pupillana**, *Cl.* 16-18 mm. Forewings white, base and dorsum sprinkled with pale ochreous, costa posteriorly spotted with ochreous; a straight oblique fascia limiting basal patch, and narrow central fascia connected in middle by a sinuate streak with apex ochreous irrorated with fuscous; ocellus

including three silvery-metallic marks connected by a longitudinal ochreous-whitish bar marked with two rows of square black dots. Hindwings grey.

Essex to Devon, Pembroke, York, local; C. Europe, Asia Minor; 8. Larva yellow-whitish; dorsal and subdorsal lines pinkish: in stems of *Artemisia absynthium;* 10-7.

15. **C. aemulana**, *Schl.* (*modestana*, HS.) 12-15 mm. Forewings pale greyish-ochreous, sometimes partly suffused with darker ochreous, costa more or less strigulated with dark fuscous and whitish; basal patch with blackish striae, interrupted above middle, edge angulated; central fascia irregular, darker ochreous, sometimes black-sprinkled, obscurely interrupted above middle; tornal area and some streaks from costa posteriorly darker ochreous; ocellus edged with silvery-metallic, including two or three black dashes. Hindwings grey.

S. England to Pembroke and Norfolk, Dumbarton, very local; Germany; 7. Larva pale yellowish; dorsal, subdorsal, and spiracular lines purple; head black; plate of 2 whitish, black-spotted: on flowers of *Solidago virgaurea;* 8, 9.

16. **C. tripoliana**, *Barr.* 13-16 mm. Differs from *C. aemulana* as follows: forewings somewhat more elongate, colour varying sometimes to fuscous or dark brown, basal patch without distinct striae, markings sometimes nearly obsolete; hindwings in ♂ more whitish anteriorly.

Essex, local; Germany; 7, 8. Larva pale rosy-yellowish; head black or dark brown; plate of 2 brown: in flowers of *Aster tripolium;* 9, 10.

17. **C. aspidiscana**, *Hb.* 15-18 mm. Forewings ochreous-brown, somewhat mixed with paler and darker scales tending to form longitudinal streaks in disc, dorsum partly darker fuscous, costa posteriorly strigulated with whitish and dark fuscous; space between basal patch and central fascia obscurely greyish-tinged; three streaks from costa posteriorly and margins of ocellus leaden-metallic, ocellus including three black dashes. Hindwings fuscous, darker terminally.

Hereford, Lancashire, Westmoreland, local; N. and C. Europe, N. America; 5, 6. Larva on flowers of *Solidago virgaurea;* 8.

18. **C. conterminana**, *HS.* 16-18 mm. Forewings ochreous, costa marked throughout with fine short darker streaks; basal patch suffused with brown posteriorly except towards costa, edge sharply angulated, followed by a paler dorsal suffusion; central fascia and a suffusion above ocellus brownish; ocellus ochreous-whitish, edged with pale golden-metallic, including

two or three incomplete lines of black scales. Hindwings grey.

Kent to Hunts and Norfolk, local; C. Europe; 7, 8. Larva reddish-grey; head yellow-brown: on flowers of lettuce (*Lactuca*); 9.

15. Notocelia, *Hb.*

Antennae in ♂ moderately or shortly ciliated. Palpi moderately long, porrected. Thorax smooth. Forewings in ♂ with strong costal fold, termen nearly straight. Hindwings in ♂ with deep subdorsal groove above, containing long blackish hair-pencil; 3 and 4 connate or stalked, 5 approximated to 4, 6 and 7 closely approximated towards base.

Includes only a few northern temperate species; a development of *Epiblema*. The larvae all feed on *Rosaceae*.

1. Forewings dark fuscous . . . 6. *tetragonana.*
 ,, not dark fuscous . . . . 2.
2. Forewings pale brownish . . 1. *uddmanniana.*
 ,, whitish . . . . 3.
3. Edge of basal patch rather rounded . . 4.
 ,, ,, ,, nearly straight . . 5.
4. Forewings mixed with grey towards costa beyond middle . . 3. *trimaculana.*
 ,, not mixed with grey towards costa posteriorly . . . 2. *rosaecolana.*
5. Edge of basal patch parallel to termen . 4. *roborana.*
 ,, ,, ,, less oblique than termen 5. *incarnatana.*

1. **N. uddmanniana**, *L.* 15-20 mm. Forewings dilated, costa moderately arched; whitish-brownish, striated with fuscous, costa posteriorly dark fuscous strigulated with whitish; angulated edge of basal patch darker; central fascia fuscous, anteriorly indistinct, ending in a large rounded-triangular dark reddish-fuscous whitish-edged dorsal spot; an oblique fuscous fascia before apex, hardly reaching costa; extreme apex dark reddish-fuscous. Hindwings grey.

England, Argyll, E. Ireland, common; C. Europe, WC. Asia to N. Persia; 6, 7. Larva dull reddish-brown; head and plate of 2 black: on bramble and raspberry (*Rubus*); 5.

2. **N. rosaecolana**, *Dbld.* 17-20 mm. Forewings dilated, costa moderately and evenly arched, fold not reaching middle; white, costa strigulated with dark fuscous; basal patch dark fuscous, edge rather rounded, followed by some grey marks

towards costa and dorsum; lower half of central fascia fuscous spotted with black, preceded by a grey mark; ocellus edged with leaden-metallic, enclosing three or four black dots; some brown or ferruginous and leaden-metallic streaks towards apex. Hindwings light grey.

Britain to the Clyde, common; Germany, Denmark; 6, 7. Larva purplish-brown, beneath whitish; head brown; plate of 2 black: on rose (especially *Rosa rubiginosa*); 5, 6.

3. **N. trimaculana**, *Hw.* (*suffusana*, Z.) 15-16 mm. Differs from *N. rosaecolana* as follows: forewings somewhat narrower, costa less arched, fold reaching middle, ground-colour much mixed and marked with grey except on a quadrate dorsal spot beyond basal patch; hindwings grey.

Britain to the Clyde, N. Ireland, common; C. Europe, WC. Asia to N. Persia; 6. Larva reddish-brown, sometimes tinged with greenish; head light brown; plate of 2 black: on hawthorn; 4, 5.

4. **N. roborana**, *Tr.* 18-21 mm. Forewings elongate, costa at first straight, beyond middle arched, fold reaching middle; whitish, much strigulated with grey, usually clearest towards dorsum beyond basal patch; costa towards middle suffused with fuscous, posteriorly strigulated with dark fuscous; basal patch dark fuscous, edge straight, parallel to termen; a triangular dark fuscous and black praetornal spot, with usually some black scales above it in disc; ocellus edged with leaden-metallic, enclosing several black dots or a wavy line; apical area streaked with ferruginous and leaden-metallic. Hindwings whitish-grey.

Britain to the Clyde, E. Ireland, common; C. Europe; 7. Larva reddish-brown; head light brown; plate of 2 black: on rose; 5, 6.

5. **N. incarnatana**, *Hb.* (*amoenana*, Hb.) 14-18 mm. Forewings with costa slightly arched, fold reaching middle; rosy-whitish, sometimes ochreous-tinged, sometimes striated with fuscous, costa strigulated with dark fuscous; basal patch fuscous or ferruginous-brown, black-marked, edge nearly straight; central fascia ill-defined, grey or ferruginous, with black posterior subdorsal projection; apical area streaked with ferruginous and leaden-metallic, marked with black. Hindwings whitish-fuscous.

England, E. Ireland, local; C. and S. Europe; 7. Larva reddish-brown; head light brown; plate of 2 black: on rose; 5, 6.

6. **N. tetragonana**, *Stph.* 13-15 mm. Forewings with costa

gently arched, rather dark fuscous, posteriorly striated with leaden-metallic, costa towards apex strigulated with whitish; a subquadrate ochreous-white median dorsal spot, pointed above. Hindwings dark fuscous.

England, E. Ireland, local; Germany; 7. Larva on rose; 5, 6.

16. SPHAEROECA, *n.g.*

Characters of *Epiblema*, but hindwings in ♂ with a long hair-pencil from base lying along costa beneath forewings.

Only the single species is known.

1. **S. obscurana**, *Stph.* (*ravulana*, HS.) 12-14 mm. Forewings rather dark fuscous; some pairs of indistinct pale costal strigulae; a subquadrate spot on middle of dorsum formed of three ill-defined whitish strigulae; ocellus obscurely edged with dull leaden-metallic. Hindwings rather dark fuscous.

Kent to Norfolk, York, N. Ireland, scarce and local; N. Europe, N. Germany; 6.

17. EPIBLEMA, *Hb.*

Antennae in ♂ moderately or shortly ciliated. Palpi moderately long, porrected. Thorax smooth. Forewings in ♂ with strong costal fold; termen straight or sinuate. Hindwings: 3 and 4 stalked or coincident, 5 approximated to 4, 6 and 7 closely approximated towards base.

A large genus, but almost wholly confined to the temperate regions of the Northern hemisphere; derived from *Epinotia*.

1. Edge of basal patch straight, parallel to termen . . 1. *tripunctana*.
,, ,, ,, not so formed . . 2.
2. Termen of forewings markedly sinuate . . 3.
,, ,, not or hardly sinuate . 15.
3. Forewings ochreous . . . . 4.
,, not ochreous . . . . 8.
4. Dorsal area distinctly paler . 26. *expallidana*.
,, ,, not distinctly paler . . . 5.
5. Ocellus metallic-edged . . . . 6.
,, not metallic-edged . 25. *caecimaculana*.
6. Disc longitudinally whitish-streaked . 29. *cana*.
,, not longitudinally whitish-streaked . . 7.
7. Expanse 20 mm. or more, colouring very uniform 27. *fulvana*.
,, 19 mm. or less, colouring more varied 28. *scopoliana*.

8. Dorsal half of forewings conspicuously paler 5. *crenana*.
,, ,, ,, not markedly paler . 9.
9. Central fascia metallic-edged . 10. *distinctana*.
,, ,, not metallic-edged . . . 10.
10. Edge of basal patch acutely angulated . . 11.
,, ,, ,, obtusely angulated . . 12.
11. Forewings with subquadrate whitish dorsal median spot . . . 7. *immundana*.
,, without such spot . . 4. *nisella*.
12. Head ochreous-white . . . . 13.
,, not ochreous-white . . . . 14.
13. Central fascia interrupted, metallic-mixed 2. *subocellana*.
,, ,, entire, not metallic-mixed 6. *demarniana*.
14. Forewings with ground-colour ferruginous 3. *penkleriana*.
,, ,, ,, fuscous 8. *tetraquetrana*.
15. Forewings with bent pointed white median dorsal mark . . . 19. *foenella*.
,, without such mark . . . 16.
16. Forewings with distinct subquadrate whitish median dorsal spot . . 17.
,, without such spot . . . 20.
17. Ocellus partly or wholly whitish . . . 18.
,, not whitish . . . . 19.
18. Ocellus more or less metallic-edged, enclosing black dots . . . 14. *pflugiana*.
,, not metallic-edged, without black dots 13. *similana*.
19. Dorsal spot strigulated with dark fuscous 15. *trigeminana*.
,, ,, not strigulated with dark fuscous 16. *brunnichiana*.
20. Forewings ochreous-white . . 20. *bilunana*.
,, not whitish . . . . 21.
21. Expanse 13 mm. or less . . . . 22.
,, 17 mm. or more . . . . 24.
22. Hindwings grey . . . . . 23.
,, dark fuscous . . . 9. *nigricana*.
23. Face and palpi whitish . . . 11. *tedella*.
,, ,, pale brownish . 12. *nemorivaga*.
24. Forewings with two small black dorsal spots 21. *ophthalmicana*.
,, without such spots . . . 25.
25. Ocellus metallic-edged . . . 17. *turbidana*.
,, not metallic-edged . . . 26.

26. Forewings rather broad; antennae in ♂ fasciculated . . 18. *grandaevana.*
„ rather elongate; antennae in ♂ simply ciliated . . . . 27.
27. Hindwings whitish-fuscous . 23. *semifuscana.*
„ rather light fuscous . . . 28.
28. Forewings commonly with whitish or red-brown dorsal blotch, termen less oblique 22. *solandriana.*
„ without such blotch, termen more oblique . . . 24. *sordidana.*

1. **E. tripunctana**, *F.* 14-20 mm. Palpi ochreous-yellowish. Forewings dilated, costa slightly arched; ochreous-white, costa strigulated with dark grey; basal patch large, dark fuscous, edge straight, parallel to termen; central fascia grey, confluent with basal patch on costa, interrupted below middle; ocellus edged with leaden-metallic, enclosing three black dots; a triangular dark grey apical spot. Hindwings light grey, in ♀ darker.

Britain to the Orkneys, Ireland, common; C. and S. Europe, WC. Asia to N. Persia; 5, 6. Larva reddish-brown; head black: on rose, bramble, etc.; 4, 5.

2. **E. subocellana**, *Don.* (*campoliliana*, Tr.) 11-13 mm. Head ochreous-white. Forewings ochreous-white, costa and dorsum strigulated with dark fuscous; basal patch striated with black, interrupted near costa, edge obtusely angulated; central fascia mixed with pale ferruginous, leaden-metallic, and black, narrowly interrupted above middle; ocellus leaden-metallic, with central series of connected black marks; apex with ferruginous and leaden-metallic striae; termen sinuate. Hindwings fuscous, darker terminally.

Britain to the Orkneys, N. Ireland, common; C. Europe; 6. Larva pale green; head yellow-brown: on *Salix caprea*; 8, 9.

3. **E. penkleriana**, *F.R.* 13-15 mm. Forewings ferruginous or dark ferruginous-fuscous, costa strigulated with white or grey; space between obtusely angulated edge of basal patch and subdorsally indented central fascia often more or less suffused with whitish; margins of ocellus and some striae above it obscurely leaden-metallic; termen sinuate. Hindwings fuscous, darker terminally.

Britain to the Orkneys, N. Ireland, very common; N. and C. Europe; 7. Larva pale green; head and plate of 2 somewhat darker, brown-marked: in catkins and buds of hazel and alder; 11-5.

4. **E. nisella**, *Cl.* (*cinerana*, Hw.) 13-15 mm. Forewings grey, more or less mixed with white, slightly ferruginous-tinged, irregularly strigulated with blackish-grey; basal patch darker, edge more blackish, acutely angulated in middle; often a ferruginous or red-brown flattened-triangular dorsal blotch beyond this; central fascia slender, irregular, somewhat darker; edges of ocellus, and sometimes a stria above them leaden-metallic; sometimes whole wing suffused with ferruginous except basal and terminal patches; termen sinuate. Hindwings light fuscous, terminally dark fuscous.

Britain to Perth, Ireland, common; C. Europe, N. America; 8. Larva pale green; head dark brown: in catkins and on leaves of poplar and *Salix caprea;* 6.

5. **E. crenana**, *Hb.* 13-16 mm. Forewings narrow, dark ashy-fuscous, sometimes more grey or reddish-tinged, costa strigulated with whitish; dorsal half varying from whitish to ferruginous-brown, rounded-prominent in middle and posteriorly, partially edged with blackish marks above; sometimes a triangular blackish-fuscous praetornal spot; termen sinuate. Hindwings fuscous, termen darker.

Norfolk, York, Westmoreland, Perth, scarce and local; C. Europe; 4. Larva pale green; head pale brown: on *Salix caprea;* 7, 8.

6. **E. demarniana**, *F.R.* 13-15 mm. Head and palpi ochreous-whitish. Forewings whitish, costa spotted and strigulated with dark fuscous; basal patch suffused with dark brown, black-marked, edge obtusely angulated; central fascia ferruginous-brown, strigulated with black; costal half beyond this mixed with dark grey and streaked with ferruginous; ocellus partly edged with leaden-metallic; termen sinuate; a white subapical dash in cilia. Hindwings rather dark fuscous.

Kent and Sussex to Norfolk, Cheshire, local; C. Europe, Asia Minor; 6, 7. Larva in catkins of birch and *Salix caprea;* 4, 5.

7. **E. immundana**, *F.R.* 12-14 mm. Differs from *E. tetraquetrana* as follows: forewings darker fuscous, hardly ferruginous-mixed, basal patch more blackish, edge acutely angulated, dorsal whitish spot more distinct, dark spot before ocellus less marked.

Britain to Ross, E. Ireland, local; C. Europe; 4, 5. Larva light greenish-grey; head brownish-ochreous: on birch and alder; 7, 8.

8. **E. tetraquetrana,** *Hw.* 12-15 mm. Forewings fuscous, darker-strigulated, often whitish-mixed, costa strigulated with blackish and posteriorly with white; edge of basal patch suffused with ferruginous-brown, partly blackish-marked, obtusely angulated; beyond this sometimes an obscure whitish subquadrate dorsal spot; central fascia darker, often ferruginous-suffused; costal half beyond this sometimes ferruginous-suffused, with some black scales; ocellus obscurely edged with leaden-metallic, usually preceded by a small black subdorsal spot; termen sinuate; a white subapical dash in cilia. Hindwings grey.

Britain to the Orkneys, Ireland, very common; N. and C. Europe; 5. Larva pale yellowish-green; head and plate of 2 dark or light brown: on birch and alder (when young, in swellings in twigs); 7-10.

9. **E. nigricana,** *HS.* 11-13 mm. Forewings dark fuscous, anteriorly lighter-striated, costa posteriorly obscurely strigulated with whitish; central fascia indistinctly darker; ocellus edged with leaden-metallic; termen faintly sinuate. Hindwings dark fuscous.

Hereford, Essex, Norfolk, Lancashire, local; Holland, Germany, Greece; 7. Larva dull yellow; head and plate of 2 black: in buds of *Pinus picea;* 9-4.

10. **E. distinctana,** *Wilk.* (*proximana,* Dbld., non HS.; (?) *fraternana,* Hw.) 11-12 mm. Face and palpi pale whitish-ochreous. Forewings dark fuscous, costa posteriorly spotted with whitish; central fascia broad, narrowed on costa, limited by light leaden-metallic-grey fasciae, first straight, including a dark fuscous stria, second somewhat curved; termen sinuate; a white subapical dash in cilia. Hindwings fuscous, darker terminally.

Dorset, Hereford, Norfolk, N. England from York, N. Ireland, local; Germany; 6, 7. Larva very pale green; head and plate of 2 light yellowish-brown: on *Pinus picea:* 8-10.

11. **E. tedella,** *Cl.* (*hyrciniana,* Wilk.) 11-13 mm. Face and palpi whitish. Forewings pale brownish, strigulated or often wholly suffused with dark fuscous, costa posteriorly strigulated with white; sometimes a whitish fascia within basal patch; central fascia narrowed towards costa, limited by two pairs of silvery-white or grey sometimes almost obsolete striae, first somewhat curved, second somewhat interrupted in middle; disc posteriorly often whitish-mixed; termen hardly sinuate; a white subapical dash in cilia. Hindwings grey.

Britain to the Orkneys, Ireland, abundant; N. and C. Europe; 5, 6. Larva green; subdorsal line rather broad, reddish-grey; head and plate of 2 black: on *Pinus abies:* 8-3.

12. **E. nemorivaga**, *Tgstr.* (*finitimana*, Dbld.) 10-11 mm. Face and palpi pale brownish. Forewings silvery-whitish, finely strigulated with fuscous, costa posteriorly strigulated with dark fuscous and white; some scattered dark fuscous strigulae; basal patch with edge somewhat bent, central fascia with posterior median projection, and an irregular spot touching termen in middle dark fuscous; termen hardly sinuate; a white subapical dash in cilia. Hindwings grey.

Perth to Sutherland, local; N. and mountains of C. Europe; 6, 7. Larva pale yellowish; head dark brown: in leaves of *Arctostaphylos uva-ursi;* 5.

13. **E. similana**, *Hb.* (*bimaculana*, Don.) 17-21 mm. Forewings dark purple-grey or ashy-fuscous, mixed with ferruginous and somewhat marked with black, costa more or less strigulated with dark fuscous and pale ferruginous; a rounded or pointed median dorsal blotch, and round tornal blotch whitish-ochreous or white, former often, latter always with a central transverse ochreous or fuscous line; termen faintly sinuate. Hindwings grey, apex sometimes ferruginous-tinged.

Britain to Ross, Ireland, common; C. Europe, N. Asia, N. America; 9. Larva grey-whitish; spots black; head yellow-brown; plate of 2 greenish-ochreous: on birch; 6, 7.

14. **E. pflugiana**, *Hw.* (*cirsiana*, Z.; *scutulana*, Wilk.) 13-22 mm. Forewings ferruginous-ochreous, sometimes (especially in ♀) suffused with dark fuscous except towards apex, broadly striated throughout with leaden-metallic, with four pairs of white costal strigulae on posterior half; a large subquadrate ochreous-whitish median dorsal spot, including two or three small dark dorsal strigulae; ocellus ochreous-whitish, sometimes (especially in ♀) anteriorly obscured with leaden-metallic, containing transverse series of black dots. Hindwings in ♂ grey, sometimes whitish-tinged anteriorly, in ♀ dark fuscous.

Britain to the Orkneys, Ireland, common; C. Europe, WC. Asia to N. Persia; 6, 7. Larva rosy-fleshcolour; spots brown; head and plate of 2 black: in stems of *Carduus*, *Centaurea*, and *Inula;* 10-5.

[*E. costipunctana*, Hw., from Norfolk, existing only in one old specimen, may be an aberration of a species of this group, but is too doubtful to admit of quotation.]

15. **E. trigeminana**, *Stph.* 13-17 mm. Forewings fuscous,

more or less mixed with whitish and striated with dark fuscous, costa posteriorly dark fuscous strigulated with whitish; basal patch posteriorly dark fuscous, edge irregular, rather rounded, followed by a subquadrate whitish dorsal spot strigulated with dark fuscous, often connected with costa by one or two whitish striae; central fascia dark brown, irregular; apical area beyond this streaked with dark fuscous or ferruginous-brown and leaden-grey. Hindwings fuscous, darker terminally, disc sometimes whitish-tinged.

Britain to the Clyde, E. Ireland, rather local; Germany; 6, 7. Larva pinkish-yellow, dorsal area sometimes rosy; head and plate of 2 pale brownish: in rootstocks of *Senecio jacobaea;* 9-12.

16. **E. brunnichiana**, *Fröl.* 15-19 mm. Forewings varying from whitish-ochreous to dark brown, posteriorly striated with silvery-metallic or leaden-metallic; in dark specimens costa strigulated with dark fuscous and whitish; an ochreous-whitish subquadrate median dorsal blotch, anterior edge straight, somewhat oblique; sometimes a transverse series of black dots in and above ocellus. Hindwings dark fuscous, sometimes tinged with whitish-ochreous.

Britain to Caledonian Canal, Ireland, common; C. and SE. Europe; 5, 6. Larva in roots and flower-stalks of *Tussilago farfara;* 4.

17. **E. turbidana**, *Tr.* 20-22 mm. Forewings light greyish-ochreous irrorated with brown, costa posteriorly strigulated with brown and whitish; basal patch posteriorly ochreous-brown, edge angulated, lower part straight; central fascia ochreous-brown, narrow and indistinct towards costa; several ochreous-brown posterior striae; ocellus obscurely edged with leaden-metallic. Hindwings fuscous, darker terminally.

Devon, York to the Clyde, local; C. Europe; 7. Larva probably in roots of *Petasites.*

18. **E. grandaevana**, *Z.* 21-30 mm. Antennae in ♂ shortly fasciculated. Forewings posteriorly dilated, light ochreous-brownish, strigulated with dark fuscous and grey-whitish; basal patch darker posteriorly, edge sharply angulated, irregular; central fascia irregular, darker or nearly obsolete, not nearly reaching dorsum. Hindwings pale fuscous, darker terminally.

Durham, local; NC. and mountains of C. Europe; 7. Larva in roots of *Tussilago* and *Petasites;* 3-5.

19. **E. foenella**, *L.* 17-25 mm. Forewings with fold reaching beyond middle; deep reddish-brown, costa greyer and posteriorly strigulated with grey or whitish; a white fascia-like mark from

dorsum before middle, reaching more than half across wing, its apex emitting a strong pointed projection towards tornus; ocellus pale grey, with two or three brown dots. Hindwings rather dark fuscous.

Kent to Hants and Norfolk, local; C. and SE. Europe, WC. Asia to Turkestan; 7. Larva yellow-whitish; head dark brown; plate of 2 brownish-ochreous: in stems and roots of *Artemisia vulgaris;* 10-5.

20. **E. bilunana,** *Hw.* 12-16 mm. Head and thorax ochreous-white. Forewings with fold not reaching $\frac{1}{3}$; ochreous-white, costa indistinctly blackish-strigulated; lower half of edge of basal patch forming a thick black anteriorly fuscous-edged mark; central fascia pale greyish-ochreous, indistinct, ending in a small subtriangular black praetornal spot; some black scales before termen in middle; termen rounded. Hindwings grey.

Britain to Caledonian Canal, rather common; C. Europe; 6, 7. Larva yellow-whitish; head and plate of 2 blackish-brown: in catkins of birch; 3, 4.

21. **E. ophthalmicana,** *Hb.* 18-23 mm. Head ferruginous-fuscous. Forewings elongate, with fold reaching $\frac{2}{5}$; dark ashy-fuscous, strigulated with black and sometimes with deep ferruginous; a narrow black dorsal spot before middle; a small black praetornal spot, sometimes surmounted by a ferruginous spot; termen nearly straight. Hindwings light fuscous, terminally darker.

England to York, Renfrew, N. Ireland, local; C. Europe; 7, 8. Larva dull greenish-white; spots grey; head black; plate of 2 brown, anterior edge white: on aspen (*Populus tremula*); 6.

22. **E. solandriana,** *L.* 18-21 mm. Forewings elongate, costa moderately arched, fold reaching $\frac{1}{3}$; varying from whitish-ochreous or brownish to ferruginous, more or less darker-strigulated, sometimes whitish-mixed; basal patch with angulated edge, and central fascia narrowed towards extremities sometimes darker; a rounded triangular white or pale median dorsal blotch, sometimes replaced by a more elongate semioval dark reddish-brown blotch; termen rather oblique. Hindwings light grey.

Britain to the Orkneys, Ireland, common; N. and C. Europe; 7, 8. Larva grey-whitish or dull greenish; head pale brown or partly black; plate of 2 whitish or brown: on hazel, birch, and *Salix caprea;* 5, 6.

23. **E. semifuscana**, *Stph.* (*piceana*, Wilk.) 17-20 mm. Forewings elongate, fold reaching $\frac{2}{5}$; varying from whitish-fuscous or ochreous-brown to dark fuscous, costa posteriorly sometimes darker-dotted; basal patch with edge angulated, irregular median fascia, and a posterior spot in disc sometimes darker; sometimes costal half dark fuscous and dorsal whitish, latter twice sharply indented; sometimes a pale median longitudinal suffusion; termen rather oblique. Hindwings whitish-fuscous, terminally darker.

Britain to Perth, Shetland Is., local; C. Europe; 7-9. Larva whitish-green, dorsally grey; head dark brown: on *Salix caprea*; 4, 5.

24. **E. sordidana**, *Hb.* (*stabilana*, Stph.) 19-23 mm. Forewings elongate, fold reaching $\frac{1}{3}$; brown, more or less strigulated with dark brown; edge of basal patch darker on lower half, angulated; central fascia somewhat darker or obsolete, more or less interrupted near dorsum; termen more oblique than in the two preceding species. Hindwings rather light fuscous.

England to York, Orkney Is., local; C. Europe; 7, 8. Larva on alder; 5.

25. **E caecimaculana**, *Hb.* 17-21 mm. Forewings elongate, fold reaching $\frac{1}{3}$; pale greyish-ochreous, closely striated with rather dark fuscous, costa posteriorly strigulated with whitish; basal patch with edge obtusely angulated above middle, and central fascia with posterior median projection somewhat darker; ocellus obscurely edged on lower half with whitish-ochreous, enclosing two or three black scales; termen sinuate. Hindwings grey, termen darker.

Kent to Dorset and Surrey, Lancashire, local; C. Europe, Asia Minor; 7.

26. **E. expallidana**, *Hw.* 16-18 mm. Head more or less whitish. Forewings elongate, fold reaching to near middle; light ochreous-brown, darker in disc longitudinally, dorsal area below submedian fold distinctly paler, somewhat indented with darker brown before middle; costa posteriorly strigulated with paler and darker; ocellus ill-defined, whitish-ochreous, obscurely metallic-edged, including two sometimes interrupted black dashes; termen sinuate. Hindwings grey.

England, local; C. Europe, WC. Asia to N. Persia; 7. Larva orange, beneath (or sometimes wholly) whitish; head dark brown; plate of 2 light brown: in flower-heads of *Sonchus arvensis*; 8, 9.

27. **E. fulvana**, *Stph.* 20-23 mm. Forewings elongate, fold

reaching to near middle; light ochreous or ochreous-brownish, costa with pale whitish-ochreous streaks reaching ⅓ across wing, anteriorly suffused; basal patch posteriorly and central fascia sometimes somewhat darker, space between them dorsally paler or obscurely whitish-ochreous; ocellus pale ochreous, metallic-edged, including three more or less incomplete longitudinal rows of black scales; termen sinuate. Hindwings grey or whitish-grey, darker terminally.

Britain to the Orkneys, N. Ireland, local; C. Europe; 6, 7. Larva pale pink; head brown; plate of 2 yellowish-brown: in seedheads of *Centaurea scabiosa;* 8.

28. **E. scopoliana,** *Hw.* (*hohenwarthiana,* Gn., Wilk.; *parvulana,* Wilk.) 15-19 mm. Forewings elongate, fold reaching to near middle; pale ochreous, sometimes much mixed with grey, costal edge sometimes dark fuscous, posteriorly with ochreous-whitish streaks reaching ⅓ across wing; oblique lower half of basal patch posteriorly, and central fascia with posterior median projection deeper ochreous or red-brown, former sometimes dark fuscous; ocellus pale ochreous, metallic-edged, with three very incomplete series of black scales; termen sinuate. Hindwings light grey, darker terminally.

Britain to the Clyde, E. Ireland, common; C. and S. Europe; 6-8. Larva dull yellowish-pink; dorsal and subdorsal lines faintly redder; head and plate of 2 brown: in flower-heads of *Centaurea nigra;* 8, 9.

29. **E. cana,** *Hw.* (*hohenwarthiana,* Tr.; *scopoliana,* Wilk.) Forewings elongate, fold reaching to near middle; ochreous, somewhat blackish-sprinkled, with several suffused ochreous-whitish longitudinal streaks confluent in middle towards base, ceasing before very narrow central fascia of ground-colour; an oblique wedge-shaped ferruginous suffusion from dorsum near base; posterior half of costa with very oblique whitish strigulae, abruptly ceasing at ⅓; ocellus metallic-edged, containing one or two incomplete black dashes; termen sinuate. Hindwings in ♂ pale grey, darker terminally, in ♀ darker.

Britain to the Clyde, rather local; Germany (probably elsewhere, but often confused with the preceding); 6-8. Larva dull pink; head and plate of 2 brown: in seedheads of *Carduus* and *Centaurea;* 8, 9.

18. HEMIMENE, *Hb.*

Antennae in ♂ simple or shortly ciliated. Palpi moderate or rather long, porrected. Thorax smooth. Forewings in ♂

with costal fold; termen slightly sinuate. Hindwings: 3 and 4 connate, 5 parallel to 4, 6 and 7 remote at origin, tolerably parallel.

A rather small northern temperate genus; some of the more obscure species require careful attention for their discrimination.[1] All the larvae feed in roots or shoots of *Compositae*.

1. Forewings with dorsal blotch yellow or orange-tinged . 2.
,, ,, ,, not yellow or orange-tinged . 5.
2. Dorsal blotch distinctly orange . . . 3.
,, not orange . . . . 4.
3. Dorsal blotch distinct, clear orange . 2. *alpinana.*
,, obscure, tinged with orange 1. *alpestrana.*
4. Dorsal blotch rather broad, yellow 3. *quaestionana.*
,, narrow, whitish-yellow 4. *petiverella.*
5. Dorsal blotch ochreous-whitish . . 5. *sequana.*
,, not whitish . . . 6.
6. Costal fold reaching $\frac{1}{3}$ . . . . 7.
,, reaching $\frac{2}{5}$ . . . . 8.
7. Forewings purplish-tinged, costa straighter 8. *acuminatana.*
,, not purplish-tinged, costa more arched 9. *tanaceti.*
8. Dorsal blotch straight-edged, without darker streak 6. *simpliciana.*
,, sinuate-edged, enclosing darker streak 9.
9. Forewings greenish-tinged, costal white strigulae conspicuous . 11. *plumbagana.*
,, not greenish, costal strigulae inconspicuous . . . 10.
10. Dorsal blotch moderately broad; expanse 13-15 mm. 10. *senectana.*
,, narrow; expanse 9-13 mm. 7. *consortana.*

1. **H. alpestrana**, *HS.* 11-14 mm. Forewings dark fuscous, posteriorly irrorated with orange-ochreous, costa posteriorly strigulated with whitish; an oblique transverse ill-defined paler orange-tinged median dorsal blotch, including some darker central strigulae; some indistinct blackish marks in disc; two

---

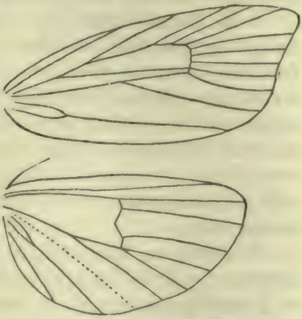
[1] I am much indebted to Mr. J. Hartley Durrant for communicating to me his conclusions on the synonymy of this genus (which has been rather confused than elucidated by recent writers), together with a series of named types; I have been able to assent fully to his views.

streaks from costa posteriorly and margins of ocellus bluish-leaden-metallic; three or more black dots on termen towards middle. Hindwings dark fuscous, lighter basally.

Essex, local; Germany; 6, 7. Larva whitish; head pale brown: in roots of *Achillea ptarmica;* 8-4.

2. **H. alpinana,** *Tr.* (*politana,* Gn.) 13-15 mm. Forewings rather dark fuscous, much mixed or almost wholly suffused with orange or bright ferruginous, costa posteriorly strigulated with whitish; a dull orange very oblique transverse median dorsal blotch, edges nearly straight; two dark leaden-metallic very oblique streaks from costa posteriorly; three black dots on middle of termen, and a pale subapical dash. Hindwings dark fuscous, lighter basally.

England to York, N. Ireland, local; Germany; 6, 7. Larva yellow-whitish; head light brown; plate of 2 brownish-tinged: in rootstocks of *Achillea millefolium* and *Tanacetum;* 10-5.



Neuration of *Hemimene plumbagana.*

3. **H. quaestionana,** *Z.* (*alpinana,* Stt.) 14-15 mm. Differs from *H. politana* as follows: forewings broader, less orange-mixed, termen less oblique, dorsal blotch broader, paler, more distinctly defined, less oblique, more curved.

England to York, local; C. Europe, N. America; 7, 8. Larva pale yellow; head dark brown; plate of 2 pale yellowish-brown: in rootstocks of *Tanacetum vulgare;* 10-5.

4. **H. petiverella,** *L.* (*flavidorsana,* Knaggs) 10-13 mm. Forewings dark fuscous, posteriorly irrorated with pale orange-ochreous, costa posteriorly strigulated with whitish; a sharply marked whitish-yellowish rather narrow curved transverse median dorsal blotch; two dark leaden-metallic oblique streaks from costa posteriorly; three or four black dots on termen towards middle, and a whitish subapical dash. Hindwings dark fuscous, lighter basally.

Britain to Caledonian Canal, E. Ireland, very common; N. and C. Europe; 6-8. Larva pinkish-white; head yellowish-brown; plate of 2 brownish-tinged: in roots of *Achillea millefolium* and *Tanacetum;* 9-4.

5. **H. sequana,** *Hb.* 9-11 mm. Forewings dark fuscous,

towards base mixed with ochreous-whitish, posteriorly irrorated with pale orange-ochreous, costa posteriorly strigulated with whitish; a sharply-marked ochreous-whitish broad straight transverse median dorsal blotch; two leaden-metallic oblique streaks from costa posteriorly; three or four black dots on termen towards middle, and a whitish subapical dash. Hindwings fuscous.

S. England to Hereford and Norfolk, local; Germany; 6. Larva in roots of *Tanacetum vulgare;* 8-4.

6. **H. simpliciana**, *Hw.* (*caliginosana*, Tr.) 13-15 mm. Forewings considerably dilated posteriorly, fold reaching $\frac{2}{5}$; dark fuscous, irrorated with pale ochreous, costa posteriorly obscurely streaked with dull purplish-metallic; a paler triangular straight-edged median dorsal blotch, darker-margined anteriorly; three minute indistinct black dots on termen towards middle, and sometimes a whitish subapical dash; termen rounded, little oblique, sinuation well-marked. Hindwings fuscous, darker posteriorly.

England to Lancashire, E. Ireland, rather local; Holland, Germany; 7, 8. Larva dull whitish; head light brown; plate of 2 faintly brownish: in rootstocks of *Artemisia vulgaris;* 10-5.

7. **H. consortana**, *Wilk.* (*distinctana*, Barr., non Hein.) 9-13 mm. Forewings with fold reaching $\frac{2}{5}$; dark fuscous, sharply irrorated with pale ochreous-yellowish, with some interrupted black dashes, and marked throughout with interrupted bluish-leaden-metallic streaks, costa posteriorly strigulated with whitish; a narrow-triangular irregular-edged median dorsal blotch, formed by two leaden-metallic whitish-edged streaks enclosing a streak of ground-colour; three or four black dots on termen towards middle, and a whitish subapical dash. Hindwings fuscous.

England, E. Ireland, local; Germany; 7, 8. Larva pale yellow; head and plate of 2 brown: in shoots of *Chrysanthemum leucanthemum;* 5, 6.

8. **H. acuminatana**, *Z.* 11-15 mm. Forewings with costa straighter than in any other, fold reaching $\frac{1}{3}$; dark fuscous, purplish-tinged, more or less obscurely irrorated with ochreous, costa posteriorly with obscure leaden-metallic streaks; basal area paler-streaked; a paler broad triangular straight-edged median dorsal blotch; three black dots on termen towards middle, sometimes nearly obsolete; termen straight, sinuation very slight, white line of cilia sharply marked. Hindwings light fuscous, in ♀ darker.

Britain to the Clyde, Orkney Is., Shetland Is., local; C. Europe; 5, 6, 8. Larva whitish; head light brown; plate of 2 faintly brownish: in rootstocks and shoots of *Chrysanthemum* and *Tanacetum;* 10-4, 7.

9. **H. tanaceti**, *Stt.* (*herbosana*, Barr.) 12-13 mm. Forewings with fold reaching $\frac{1}{3}$; dark fuscous, sharply irrorated with pale yellow-ochreous, towards base suffusedly striated with whitish-fuscous; an oblique rather irregular-edged median dorsal blotch formed of several subconfluent whitish-fuscous striae, narrowed upwards, reaching more than half across wing; costa strigulated towards middle with fuscous-whitish, posteriorly with dull leaden-metallic; ocellus irregularly edged with leaden-metallic; three black terminal dots below middle. Hindwings grey.

Lancashire, York, Durham, local; not recognised elsewhere; 5, 6. Larva whitish; head and plate of 2 light brown: in roots of *Achillea millefolium* and *Tanacetum;* 10-4.

10. **H. senectana**, *Gn.* 13-15 mm. Forewings with fold reaching $\frac{2}{5}$; dark fuscous, sharply irrorated with pale ochreous, costa posteriorly obscurely strigulated with whitish; some streaks from costa posteriorly and margins of ocellus purplish-leaden-metallic; an obscure hardly paler subtriangular sinuate-edged median dorsal blotch, enclosing a darker streak; three black dots on termen towards middle; termen somewhat rounded, sinuation well-marked. Hindwings fuscous, darker posteriorly.

Kent to Devon and Pembroke, local; France, Holland; 6. Larva perhaps in rootstocks of *Chrysanthemum.*

11. **H. plumbagana**, *Tr.* 12-14 mm. Forewings with fold reaching $\frac{2}{5}$; dark fuscous, sharply irrorated with pale ochreous, slightly greenish-tinged, costa posteriorly strigulated with silvery-whitish; some streaks from costa posteriorly and margins of ocellus bright silvery-leaden-metallic; an obscure leaden-metallic dorsal blotch with darker central streak, narrowed upwards, contracted beneath truncate apex; three black dots on termen towards middle; termen oblique, sinuation distinct. Hindwings grey, paler towards base.

Britain to the Shetlands, E. Ireland, very common; C. Europe; 6. Larva yellowish-white; head light brown; plate of 2 very pale brown: in rootstocks of *Achillea millefolium;* 9-4.

19. LIPOPTYCHA, *Ld.*

Antennae in ♂ simple. Palpi moderately long, porrected. Thorax smooth. Forewings with termen slightly sinuate.

Hindwings: 3 and 4 connate, 5 parallel to 4, 6 and 7 remote at base, tolerably parallel.

Includes only a few species, in distribution and habits similar to the preceding; derived from *Laspeyresia*.

Ocellus distinctly margined with leaden-metallic 2. *plumbana*.
,, not margined with leaden-metallic . 1. *saturnana*.

1. **L. saturnana**, *Gn.* 13-15 mm. Forewings dark fuscous, very densely irrorated with pale ochreous, with traces of transverse striae; costa obscurely strigulated with paler, posteriorly with two or three short leaden-metallic streaks; a median dorsal blotch very faintly indicated; three or four black dots on termen towards middle; termen little oblique, sinuation hardly perceptible. Hindwings fuscous, darker posteriorly.

S. England to Pembroke and Cambridge, Westmoreland, E. and W. Ireland, local; C. Europe; 6, 7. Larva whitish; head light brown; plate of 2 faintly brownish: in rootstocks of *Tanacetum vulgare;* 10-4.

2. **L. plumbana**, *Sc.* (*ulicana*, Gn.) 11-14 mm. Forewings dark fuscous, sharply irrorated with pale ochreous, costa obscurely spotted with dark fuscous and whitish; anterior half obscurely striated or suffused with greyish, forming a slightly paler subtriangular median dorsal blotch; some streaks from costa posteriorly and margins of ocellus leaden-metallic; from three to five black dots on termen; termen rather oblique, sinuation distinct. Hindwings fuscous or dark fuscous.

Britain to the Hebrides, N. and E. Ireland, common; C. Europe, N. America; 5, 6. Larva yellowish-white; head yellow-brownish; plate of 2 ochreous: on roots of *Chrysanthemum* and *Achillea;* 8-4.

20. Acroclita, *Ld.*

Antennae in ♂ moderately ciliated. Palpi moderate, porrected. Thorax smooth. Forewings with termen slightly sinuate; 7 and 8 stalked. Hindwings: 3 and 4 connate, 5 somewhat approximated to 4, 6 and 7 closely approximated towards base.

Only one species is known.

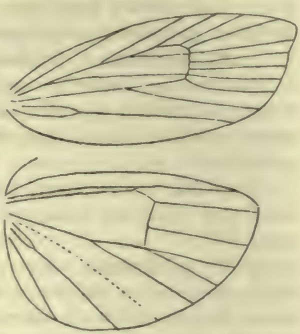
1. **A. consequana**, *HS.* (*hawkerana*, Stt.) 11-14 mm. Forewings pale ferruginous-brown, sometimes mixed with ochreous-whitish and blackish, costa posteriorly spotted with darker; basal patch darker, edge angulated, well-marked; central fascia darker ferruginous-brown, anterior edge suffused; an oblique ferruginous brown apical mark. Hindwings grey, darker terminally.

Hants, Dorset, local; SW. Europe; 5, 7, 8. Larva light brownish-ochreous, greenish-tinged; head light brown: on *Euphorbia paralias*, especially on the seeds; 6, 9, 10.

21. PAMMENE, *Hb.*

Antennae in ♀ simple or minutely ciliated. Palpi moderate, porrected or subascending. Thorax smooth. Forewings with termen slightly sinuate. Hindwings: 3 and 4 connate or stalked, 5 parallel to 4, 6 and 7 in ♀ closely approximated towards base, in ♂ 7 running into 8 soon after origin.

A rather limited genus, confined to northern temperate regions.



Neuration of *Pammene argyrana* ♂.

1. Forewings with yellow dorsal blotch . 2.
 ,, without yellow dorsal blotch 3.
2. Dorsal blotch almost reaching tornus . 13. *trauniana.*
 ,, ,, not nearly reaching tornus 12. *regiana.*
3. Forewings with distinct whitish dorsal blotch . 4.
 ,, without distinct whitish dorsal blotch 8.
4. Dorsal spot enclosing a dark dot . . . 5.
 ,, ,, darker-strigulated . . . 6.
5. Dorsal spot erect . . . . 10. *spiniana*
 ,, ,, somewhat obliquely bent . 11. *populana.*
6. Ground-colour irregularly black-marked . 8. *argyrana.*
 ,, not mixed with black . . 7.
7. Hindwings whitish . . . 7. *fimbriana.*
 ,, fuscous . . . 9. *gallicolana.*
8. Forewings with apical third orange . 5. *rhediella.*
 ,, ,, ,, not orange . . 9.
9. Basal patch enclosing a metallic fascia 6. *splendidulana.*
 ,, ,, not enclosing metallic fascia . . 10.
10. Face and palpi whitish . . . . 11.
 ,, ,, dark fuscous . 4. *ochsenheimeriana.*
11. Forewings with some anteapical metallic dots 3. *germarana.*
 ,, without such dots . . . 12.
12. Antemedian fascia curved . . 1. *flexana.*
 ,, ,, angulated . . 2. *nitidana.*

1. **P. flexana**, *Z.* (*weirana*, Dgl.) 10-12 mm. Face and palpi whitish. Forewings with apex rounded, termen very oblique; dark fuscous; two white costal strigulae before and four beyond middle, first pair terminating a very faint curved hardly paler somewhat metallic fascia. Hindwings fuscous.

England to York, local; France, Holland, Germany; 6. Larva dull white; head pale brown; plate of 2 brownish-tinged: between joined leaves of beech; 8, 9.

2. **P. nitidana**, *F.* (*redimitana*, Gn.) 9-10 mm. Differs from *P. flexana* as follows: forewings with distinct pale fuscous double somewhat metallic fascia beyond basal patch, angulated above middle, costal strigulae more marked, hindwings paler anteriorly.

England to York, local; France; 5, 6. Larva pale yellow; head and plate of 2 deeper yellow: between joined leaves of oak; 7-9.

3. **P. germarana**, *Hb.* (*puncticostana*, Wilk.) 11-13 mm. Face and palpi ochreous-whitish. Forewings dark fuscous, costa strigulated with whitish; two striae and some anteapical dots bluish-leaden-metallic. Hindwings dark fuscous, in ♂ with blackish spot on 1c towards termen.

Kent to Hereford and Essex, York, Westmoreland, local; C. Europe, N. Asia; 6.

4. **P. ochsenheimeriana**, *Z.* 8-9 mm. Face and palpi dark fuscous, whitish-sprinkled. Forewings dark fuscous, somewhat sprinkled finely with grey-whitish, costa posteriorly strigulated with silvery-white; edge of basal patch and narrow angulated central fascia darker, edged with silvery-metallic; some silvery-metallic marks towards apex and termen. Hindwings fuscous.

Suffolk, Norfolk, local; C. Europe; 5, 6.

5. **P. rhediella**, *Cl.* 9-12 mm. Forewings dark fuscous; central fascia darker and ferruginous-tinged; apical area beyond this wholly deep ferruginous-orange, with leaden-metallic spots and striae. Hindwings fuscous, in ♂ with blackish spot on 1c towards termen.

Britain to the Clyde, N. and E. Ireland, common; C. Europe; 5, 6. Larva on hawthorn and apple (?); 8. The imago flies in hot sunshine over the tops of hawthorn-trees.

6. **P. splendidulana**, *Gn.* 9-11 mm. Forewings dark fuscous, very finely and closely whitish-striated; costa marked with short ochreous-whitish streaks becoming silvery-metallic beneath; a leaden-metallic fascia within basal patch; angulated edge of basal patch followed by a leaden-metallic fascia triangularly

dilated on dorsum; central fascia followed by a thick leaden-metallic stria interrupted in middle by a black spot; sometimes some black scales in ocellus. Hindwings fuscous, more or less whitish-suffused anteriorly.

Britain to the Clyde, S. Ireland, common; C. Europe; 5. Larva whitish; spots black; head and plate of 2 black: between joined leaves of oak; 6, 7.

7. **P. fimbriana**, *Hw.* 14-15 mm. Forewings narrow, elongate, dark fuscous, finely sprinkled with whitish-grey, costa with darker strigulae; edge of basal patch darker, angulated, followed by an oblique quadrate obscure paler or whitish dorsal spot strigulated with dark fuscous; ocellus edged with silvery-metallic, preceded by a blackish spot or suffusion, and sometimes including some black dots. Hindwings whitish; a dark fuscous anteriorly suffused terminal fascia.

Britain to the Clyde, not common; N. and NC. Europe; 4, 5. Larva pinkish-white, with obscure whitish rings; spots red-brown; head brown; plate of 2 whitish or grey, posterior edge blackish: in galls on oak; 6-8. This and the two following species are not gall-makers themselves, but inquilines of galls made by species of *Andricus* (*Diptera*).

8. **P. argyrana**, *Hb.* (*vernana*, Knaggs) 9-13 mm. Forewings fuscous, sometimes ochreous-tinged, irregularly marked with black, costa strigulated with black and white; three streaks from costa and margins of ocellus leaden-metallic; sharply angulated edge of basal patch and central fascia darker, separated by a somewhat pentagonal white dorsal blotch more or less strigulated with blackish; a suffused blackish spot before apex. Hindwings fuscous, in ♂ basally whitish, with terminal and broader dorsal blackish fascia, in ♀ posteriorly darker fuscous.

Britain to the Clyde, very common, sitting in crevices of bark; C. Europe; 5. Larva pinkish-white, sharply ringed with white; spots red; head brown; plate of 2 whitish or grey, posterior edge blackish: in galls on oak, and probably fruits of apple; 6-8.

9. **P. gallicolana**, *Z.* (*obscurana*, Wilk.) 11-12 mm. Forewings dark brown, mixed with bluish-grey, and posteriorly with ferruginous; costa posteriorly strigulated with whitish and dark fuscous, with several bluish-leaden-metallic streaks; an irregular ochreous-white median dorsal blotch strigulated with dark fuscous; ocellus edged with purplish-leaden-metallic, including several black marks. Hindwings fuscous, darker posteriorly.

S. England to Hereford and Essex, local; C. and SW. Europe; 6. Larva whitish; spots red; head black; plate of 2 yellowish, black-marked: in galls on oak; 9, 10.

10. **P. spiniana**, *Dup.* 10-11 mm. Forewings dark fuscous, with obscure violet-metallic striae, costa obscurely paler-strigulated; a triangular white median dorsal spot, usually enclosing an obscure fuscous dorsal dot. Hindwings fuscous, in ♂ with broad terminal and dorsal dark fuscous fascia, in ♀ darker throughout.

England to York, E. Ireland, rather common in hedges; C. Europe; 8.

11. **P. populana**, *F.* (*ephippana*, Hb.) 10-11 mm. Forewings dark fuscous, costa posteriorly strigulated with whitish; a triangular ochreous-white median dorsal blotch, apex somewhat bent posteriorly, including a small triangular dark fuscous dorsal spot; three streaks from costa and margins of ocellus leaden-metallic. Hindwings dark fuscous, base lighter.

England to York, local; C. Europe; 7. Larva whitish-green; head black; plate of 2 black, anteriorly whitish-green: on *Salix caprea* and *S. repens;* 5, 6.

12. **P. regiana**, *Z.* 13-15 mm. Forewings dark fuscous, costa posteriorly with whitish strigulae yellower beneath; a rather large yellow pentagonal median dorsal blotch, not nearly reaching tornus, sometimes with a few dark fuscous scales; a streak from costa beyond middle and margins of ocellus bluish-metallic. Hindwings dark fuscous, in ♂ with blackish suffusion on 1c towards termen.

England to York, E. Ireland, common; C. and SE. Europe, Asia Minor; 6, 7. Larva whitish; head brown; plate of 2 pale ochreous: beneath bark of sycamore; 9-4.

13. **P. trauniana**, *Schiff.* 12-13 mm. Differs from *P. regiana* as follows: wings narrower, costal strigulae yellow, ending in leaden-metallic dots, metallic markings more leaden, dorsal blotch larger, more elongate and rounded, nearly reaching tornus.

Kent, Surrey, York, local; C. Europe; 6. Larva probably beneath bark of maple.

22. LASPEYRESIA, *Hb.*

Antennae in ♂ simple or minutely ciliated. Palpi moderate, curved, ascending. Thorax smooth. Forewings with termen hardly sinuate. Hindwings: 3 and 4 connate or stalked, 5 nearly parallel to 4, 6 and 7 closely approximated towards base.

A genus of some considerable extent, rather generally distributed, but mainly inhabiting the Northern hemisphere. A large proportion of the larvae feed on seeds of *Leguminosae*.

1. Forewings ochreous-white . . 4. *servillana*.
,, not white . . . . 2.
2. Forewings with leaden-metallic median dorsal mark . . . 15. *scopariana*.
,, without such mark . . . 3.
3. Forewings with distinct white median dorsal spot 4.
,, without such spot . . . 13.
4. Dorsal spot without dark strigulae . . 5.
,, ,, with one or more dark marks . 6.
5. Dorsal spot rather broad, curved . . 11. *orobana*.
,, ,, narrow, less curved . . 12. *dorsana*.
6. Dorsal spot with three dark lines . . 7.
,, ,, with one dark mark . . . 8.
7. Ocellus well-defined . . . 5. *leplastriana*.
,, represented by a metallic mark 10. *compositella*.
8. Ocellus well-defined . . . . 9.
,, represented by a metallic mark . . 12.
9. Dorsal spot crossing fold . . . . 10.
,, ,, not crossing fold . 14. *leguminana*.
10. Apical area yellow-ochreous . . 7. *perlepidana*.
,, ,, not yellow-ochreous . . . 11.
11. Dorsal spot broader, curved outwards . 17. *cognatana*.
,, ,, narrower, erect . . 18. *coniferana*.
12. Face and palpi white . . 9. *pallifrontana*.
,, ,, fuscous . . . 8. *internana*.
13. Apex and termen ferruginous-orange . 2. *ianthinana*.
,, ,, not ferruginous-orange . . 14.
14. Ocellus including several black dots or dashes . 15.
,, without black dots or dashes . . 21.
15. Ocellus triangular . . . 6. *corollana*.
,, normal . . . . . 16.
16. Forewings with ground-colour light grey. 22. *ulicetana*.
,, ,, ,, fuscous or dark fuscous . 17.
17. Forewings more or less ochreous-tinged . . 18.
,, not ochreous-tinged . . 1. *roseticolana*.
18. Forewings with median metallic stria 16. *cosmophorana*.
,, without median metallic stria . . 19.
19. Forewings with ground-colour dark-striated 19. *microgrammana*.
,, ,, ,, not dark-striated . 20.

20. Posterior third of forewings suffusedly ochreous-orange 20. *gemmiferana.*
,, ,, ,, not orange 13. *nigricana.*
21. Forewings posteriorly irrorated with ochreous 21. *caecana.*
,, not irrorated with ochreous . 3. *rufillana.*

1. **L. roseticolana,** *Z.* (*germarana,* Wilk.) 11-12 mm. Palpi whitish. Forewings dark purplish-fuscous; costa posteriorly with indistinct silvery-whitish strigulae; three or four black dots transversely placed in ocellus. Hindwings fuscous, darker posteriorly.

England to York, S. Ireland, local; C. Europe; 7. Larva flesh-coloured or pinkish-white; head and plate of 2 brownish-ochreous: in fruits of rose; 9.

2. **L. ianthinana,** *Dup.* 9-11 mm. Palpi whitish. Forewings dull pinkish-ochreous, much mixed and striated with dark brown; costa dark brown, strigulated posteriorly with white; angulated edge of basal patch and central fascia darker, between them an indistinct paler oblique quadrate streaked dorsal blotch; some thick streaks from costa and margins of ocellus dark ashy-leaden-metallic, latter including some blackish marks; apex and termen ferruginous-orange. Hindwings fuscous, darker posteriorly, cilia in ♂ shortened towards tornus.

England to Lancashire, E. Ireland, rather common; C. and S. Europe; 7. Larva pale pinkish-ochreous; head light brown: in berries of hawthorn; 9.

3. **L. rufillana,** *Wilk.* 10-13 mm. Palpi whitish. Forewings dark brown, much striated irregularly with leaden-metallic; costa sometimes strigulated with whitish posteriorly; angulated edge of basal patch, slender interrupted central fascia, and curved subterminal streak darker. Hindwings fuscous.

England to York, W. Ireland, rather common; Holland, Germany; 7, 8. Larva pale pinkish-ochreous; head and plate of 2 dark fuscous: on seeds of *Daucus carota;* 9.

4. **L. servillana,** *Dup.* 11-14 mm. Forewings ochreous-white, costa and dorsum strigulated with dark grey; basal patch grey mixed with whitish and strigulated with blackish-grey, edge sharply angulated; central fascia grey, widely interrupted in disc; ocellus edged with leaden-metallic and suffusedly marked with black; apex and termen blackish-grey. Hindwings in ♂ white, apex and termen suffused with dark fuscous, in ♀ wholly dark fuscous.

Kent to Hereford and Cambridge, York, local; Holland, Germany; 5, 6. Larva grey-whitish; spots large, grey; head and plate of 2 black: in swellings in shoots of *Salix caprea;* 8, 9.

5. **L. leplastriana,** *Curt.* 12-13 mm. Forewings dark fuscous, very finely and closely whitish-striated; costa blackish, with white strigulae, some emitting leaden-metallic and ochreous streaks; basal patch much strigulated with white; an oblique white rather irregular-edged dorsal blotch, marked with three dark fuscous sometimes incomplete lines, followed by a blackish-fuscous triangular blotch; ocellus whitish-ochreous, edged with leaden-metallic, including two or three black marks. Hindwings fuscous, darker terminally, in ♂ somewhat whitish-suffused anteriorly.

Kent, Dorset, on coast, local; C. and S. Europe, N. Africa; 7. Larva grey-whitish; head black; plate of 2 black-brown: in shoots of wild cabbage (*Brassica oleracea*); 9.

6. **L. corollana,** *Hb.* (*heegerana*, Wilk.) 11-13 mm. Forewings blackish, very finely and closely striated with ochreous-whitish; basal patch with edge sharply angulated and narrow central fascia blacker; space between them more whitish, especially dorsally, crossed by one blackish and two leaden-metallic striae; costa posteriorly white, with alternate leaden-metallic and blackish streaks, and a blackish spot towards apex; ocellus triangular, whitish-ochreous, edged with leaden-metallic, including several black dashes. Hindwings dark fuscous, base paler.

Hunts (Whittlesea Mere), once many years ago, perhaps now extinct; C. Europe; 4, 5. Larva in swellings in shoots of aspen (*Populus tremula*); 7-9.

7. **L. perlepidana,** *Hw.* 10-13 mm. Forewings fuscous, dorsal half dark fuscous, apical third pale yellow-ochreous; costa strigulated with dark fuscous and white; a long narrow curved whitish median dorsal blotch, with dark fuscous central line; three streaks from costa posteriorly and margins of ocellus silvery-leaden-metallic; several black dashes in ocellus. Hindwings in ♂ white, apex and costa fuscous; in ♀ fuscous.

Britain to Caledonian Canal, N. and E. Ireland, common, often abundant; C. and SE. Europe; 5. Larva in pods of *Lathyrus macrorrhizus;* 7, 8.

8. **L. internana,** *Gn.* (*erectana*, Barr.) 9-10 mm. Forewings dark fuscous; costa with eight rather long white strigulae, some ending in violet-silvery-metallic marks; a narrow curved whitish median dorsal blotch, with dark fuscous

central line; ocellus represented by a violet-silvery-metallic transverse mark. Hindwings in ♂ white, apex narrowly dark fuscous; in ♀ dark fuscous, paler basally.

England to York, local; WC. and SW. Europe; 5, 6. Larva in pods of *Ulex*; 7-9.

9. **L. pallifrontana**, *Z.* 9-10 mm. Face and palpi white. Forewings dark fuscous; costa with eight whitish strigulae, three ending in bluish-leaden-metallic marks; a slightly curved subquadrate ochreous-whitish median dorsal blotch, with dark fuscous central line; ocellus represented by a purplish-leaden-metallic transverse mark. Hindwings dark fuscous, lighter basally.

Bucks, local; C. Europe; 7. Larva dull yellowish-green; spots brown; head and plate of 2 pale brown: in pods of *Astragalus glycyphyllos*; 8. The larva becomes brilliant red immediately before pupation.

10. **L. compositella**, *F.* 9-10 mm. Face and palpi white. Forewings dark fuscous; costa with eight long white strigulae, several ending in leaden-metallic marks; a slightly curved broad quadrate whitish median dorsal blotch, with three parallel blackish lines, surmounted by a leaden-metallic mark; ocellus represented by a leaden-metallic transverse mark. Hindwings in ♂ white, apex broadly fuscous; in ♀ dark fuscous, lighter basally.

England to York, rather common; N. and C. Europe; 6. Larva in pods of *Trifolium*; 8.

11. **L. orobana**, *Tr.* 12-15 mm. Palpi whitish. Forewings dark brown, sometimes sprinkled with pale ochreous; costa with strong ochreous-white strigulae, some ending in leaden-metallic marks; a long moderately broad curved ochreous-white median dorsal blotch; ocellus paler, edged with leaden-metallic, with several black dashes. Hindwings in ♂ whitish with broad dark fuscous terminal border, in ♀ dark fuscous, lighter basally.

Cambridge, York, very local; Europe; 7. Larva deep yellow, brownish-tinged; head and plate of 2 almost black: in pods of *Vicia sylvatica*; 8, 9.

12. **L. dorsana**, *F.* 14-17 mm. Differs from *L. orobana* as follows: palpi partly dark fuscous; antennae of ♂ unusually long and thick; forewings with costa in ♂ straighter, dorsal blotch narrow and less curved, hindwings in ♂ with dark border still broader, in ♀ wholly dark fuscous.

York to Caledonian Canal, local; C. Europe, Asia Minor;

5, 6. Larva deep yellow; head somewhat darker: in pods of *Lathyrus macrorrhizus* (and perhaps *L. pratensis*); 7.

13. **L. nigricana**, *Stph.* (*nebritana*, Z., non Tr.; *proximana*, Wilk.; *pisana*, Gn.) 12-14 mm. Palpi ochreous-whitish. Forewings dark fuscous, ochreous-tinged; costa with ochreous-white strigulae, some ending in leaden-metallic marks; ocellus edged with leaden-metallic, including several black marks. Hindwings dark fuscous, lighter anteriorly.

Britain to the Clyde, E. Ireland, rather common; C. Europe, WC. Asia to N. Persia; 6, 7. Larva yellow-whitish; head light brown; plate of 2 pale ochreous or brownish: in pods of pea (*Pisum sativum*); 7-9.

14. **L. leguminana**, *Z.* (*interruptana*, Wilk.) 12-13 mm. Forewings dark fuscous, posteriorly somewhat ochreous-sprinkled; costa posteriorly with white strigulae; a short narrow white median dorsal spot, not crossing fold, divided by a dark fuscous indistinct strigula; ocellus edged by leaden-metallic striae, including several black marks. Hindwings fuscous.

Essex, Devon, scarce and local; Germany, Austria, NW. Russia; 6.

15. **L. scopariana**, *HS.* 11-12 mm. Forewings dark fuscous, posteriorly suffused with pale ochreous; costa posteriorly with white strigulae, several ending in leaden-metallic marks; an erect leaden-metallic median dorsal mark; ocellus edged with leaden-metallic, including several black marks. Hindwings fuscous, apex whitish, costa before apex with two dark fuscous marks.

Lancashire, local; C. Europe; 4, 5. Larva deep yellow; dots black; head pale brownish: in flowers of *Genista tinctoria*; 6, 7.

16. **L. cosmophorana**, *Tr.* 10-14 mm. Forewings dark fuscous, posteriorly very finely striated with pale ochreous; a bent median leaden-metallic stria, white on costa; four thick white strigulae on costa posteriorly, a somewhat curved stria from first edging ocellus, streaks from last two, and posterior edge of ocellus leaden-metallic; ocellus yellow-ochreous, crossed by several black dashes. Hindwings rather dark fuscous.

Scotland to Caledonian Canal, local; N. and C. Europe, WC. Asia to N. Persia; 6. Larva greenish-yellow; head brown: in resinous swellings in bark of *Pinus sylvestris*; 3, 4.

17. **L. cognatana**, *Barr.* 12-14 mm. Differs from *L. coniferana* as follows: forewings broader, dorsal spot broader, more triangular, curved outwards, costal strigulae more oblique, first

metallic stria dorsally more inclined towards tornus, ocellus much mixed with yellow-ochreous.

Aberdeen, Moray, local; not recorded elsewhere; 6.

18. **L. coniferana**, *Rtz.* 11-13 mm. Forewings dark fuscous, costa posteriorly with white strigulae, some ending in obscure leaden-metallic marks; an irregular erect white dorsal median spot, including a dark fuscous strigula; ocellus edged with leaden-metallic, and crossed by several black dashes. Hindwings fuscous.

Britain to Caledonian Canal, rather common; N. and C. Europe; 6, 7. Larva dull yellowish; head pale brown: in bark of *Pinus sylvestris;* 10-4.

19. **L. microgrammana**, *Gn.* 10-12 mm. Palpi whitish. Forewings rather dark fuscous, finely and closely irrorated with pale greyish-ochreous, forming darker and lighter striae, costa strigulated with dark fuscous and whitish; some leaden-metallic streaks from costa posteriorly; ocellus edged with pale golden-metallic, including two or three black linear dots. Hindwings in ♂ light grey, in ♀ darker.

Kent and Surrey to Norfolk, E. Ireland, on coasts, local; C. Europe, WC. Asia to N. Persia; 6, 7. Said to frequent *Ononis spinosa.*

20. **L. gemmiferana,** *Tr.* 12-16 mm. Forewings fuscous, on posterior third suffused with fine ochreous-orange irroration; posterior half of costa with leaden-metallic strigulae; ocellus edged with leaden-metallic, including a transverse series of four (seldom more) black dots. Hindwings grey, in ♀ darker.

Hants, local; Germany, SE. Europe; 5, 6.

21. **L. caecana**, *Schl.* 12-16 mm. Palpi rather long. Forewings elongate, ashy-fuscous, posteriorly finely and closely irrorated with pale ochreous; some fine dark longitudinal lines in disc; costa sharply strigulated with ochreous-white and blackish; some leaden-metallic and fine blackish streaks from costa posteriorly; posterior edge of ocellus golden-metallic. Hindwings in ♂ light grey, ochreous-tinged, in ♀ darker.

Kent (Deal), local; C. and SW. Europe, WC. Asia to N. Persia; 7. Larva yellow; dorsal line pale brownish; head and plate of 2 pale yellow-brown: in stems of *Onobrychis;* 8-10.

22. **L. ulicetana**, *Hw.* (*succedana*, Fröl.) 12-14 mm. Forewings light grey, striated with brownish-ochreous or fuscous, space between basal patch and central fascia often more or less whitish, forming an angulated band; costa posteriorly strigulated with dark fuscous and whitish; ocellus edged with pale

leaden-metallic, including and preceded by some black marks. Hindwings pale grey, darker terminally.

Britain to the Shetlands, Ireland, abundant; C. and S. Europe, WC. Asia to N. Persia, N. America; 5, 7, 8. Larva yellow-whitish or deep yellow; head and plate of 2 blackish or yellow-brown: in pods of *Ulex*, *Genista*, *Lotus*, etc.; 6, 9, 10.

23. CARPOCAPSA, *Tr.*

Antennae in ♂ simple. Palpi moderate, curved, ascending. Thorax smooth. Forewings with termen slightly sinuate. Hindwings in ♂ with longitudinal groove below cell, including a hair-pencil; 3 and 4 connate or stalked, 5 nearly parallel to 4, 6 and 7 closely approximated towards base.

A small but rather widely distributed genus, correlated with the preceding. The larvae all feed in fruits of trees.

1. Margins of ocellus coppery-metallic . 1. *pomonella.*
,, ,, leaden-metallic . . 2.
2. Forewings with white dorsal blotch or fascia . 3.
,, without white blotch or fascia . 4.
3. Dorsal blotch not crossing middle of wing 4. *nimbana.*
,, ,, extended to near costa . 3. *juliana.*
4. Spot before ocellus broad-triangular, brown 5. *grossana.*
,, ,, narrow-triangular, blackish
2. *splendana.*

1. **C. pomonella**, *L.* 14-19 mm. Forewings dark fuscous, finely irrorated with whitish, with darker striae; basal patch sometimes darker; a large dark coppery-brown terminal patch hardly reaching costa, anterior edge more blackish, ocellus within this edged with bright coppery-metallic. Hindwings fuscous, darker terminally.

Britain to the Clyde, S. Ireland, common; N. and WC. Asia, N. America, Australia, New Zealand; 6, 7. Larva pinkish; head pale brown, darker-marked; plate of 2 pale ochreous: in fruits of apple (sometimes also in pears and amongst spun fruits of *Pyrus aria*); 8-10. The larva is often highly injurious in orchards, but the imago is of retired habits and less often noticed. The wide geographical distribution is due to accidental importation, but the insect has everywhere established its footing.

2. **C. splendana**, *Hb.* 13-17 mm. Forewings grey, more or less densely irrorated with whitish, indistinctly darker-striated; basal patch slightly darker, edge angulated; two leaden-metallic streaks from costa posteriorly; ocellus brownish, edged with

leaden-metallic, including some blackish marks, preceded by a narrow-triangular blackish dorsal spot. Hindwings fuscous.

England to Cheshire, not uncommon; C. and S. Europe; 7. Larva whitish or pinkish; head and plate of 2 pale reddish-brown: in acorns (sometimes also in walnuts); 8-10.

3. **C. juliana**, *Curt.* 15-18 mm. Forewings grey mixed with ochreous-white, striated with dark grey, costa strigulated with dark fuscous and white; two or three leaden-metallic streaks from costa posteriorly; a broad ochreous-white fascia from middle of dorsum towards $\frac{3}{4}$ of costa, narrower and suffused upwards, limiting a dark fuscous terminal patch; ocellus within this edged with leaden-metallic, including several black and sometimes white marks, and preceded by three black spots. Hindwings dark fuscous, lighter basally.

England, rather local; C. Europe; 7. Larva whitish; spots dark red; head pale brown; plate of 2 whitish, posteriorly black-marked: in fruits of Spanish chestnut; 8-10.

4. **C. nimbana**, *HS.* 13-16 mm. Differs from *C. juliana* as follows: wings somewhat narrower, forewings with median dorsal whitish blotch triangular, not reaching more than half across wing, less defined, with dark central strigula, hindwings rather lighter.

Bucks, local; Germany; 6. Larva possibly in fruits of beech; 8, 9.

5. **C. grossana**, *Hw.* 15-18 mm. Forewings fuscous irrorated with whitish, striated with dark fuscous; basal patch slightly darker, edge sharply angulated; two leaden-metallic streaks from costa posteriorly; a large darker coppery-tinged terminal patch hardly reaching costa, ocellus within this edged with leaden-metallic, enclosing some blackish marks. Hindwings fuscous.

England, common; C. and S. Europe; 6, 7. Larva light yellowish or whitish, longitudinally clouded with orange; spots orange; head pale brownish; plate of 2 pale ochreous: in fruits of beech; 8-10.

24. EPINOTIA, *Hb.*

Antennae in ♂ moderately ciliated. Palpi moderately long, porrected. Thorax smooth. Forewings with termen sinuate or nearly straight. Hindwings: 3 and 4 separate or connate or short-stalked, 5 slightly approximated to 4, 6 and 7 closely approximated towards base or stalked.

Apparently includes only a few northern temperate species.

1. Forewings wholly or partly orange . . 2.
   „ without orange markings . 3. *funebrana.*
2. With orange median dorsal blotch . 1. *aurana.*
   Without such blotch . . . . 3.
3. Central fascia darker ferruginous-brown . 2. *albersana.*
   „ „ obsolete . . . 4. *hypericana.*

1. **E. aurana**, *F.* (*mediana*, F.) 9-12 mm. Forewings dark fuscous; a subquadrate orange median dorsal blotch, and another in disc posteriorly. Hindwings dark fuscous.

Britain to the Clyde, Ireland, rather common; C. Europe; 6, 7. The imago flies in sunshine.

2. **E. albersana**, *Hb.* 13-17 mm. Forewings ferruginous-brown, more or less mixed with ashy-grey, towards costa basally more orange; central fascia darker ferruginous-brown, edged posteriorly by a bright leaden-metallic stria; apical area beyond this ochreous-orange, with four streaks from costa and posterior edge of ocellus leaden-metallic; ocellus including two or three black marks. Hindwings in ♂ pale grey, in ♀ darker grey.

England, S. Ireland, rather common; C. Europe; 5, 6. Larva greenish-grey; head and plate of 2 yellowish, black-marked: in folded leaves of *Lonicera;* 8.

3. **E. funebrana**, *Tr.* 10-15 mm. Forewings fuscous, striated with dark fuscous, costa posteriorly obscurely strigulated with whitish; angulated edge of basal patch and central fascia darker, space between them obscurely striated with whitish irroration towards dorsum; ocellus obscurely whitish-irrorated, edged with leaden-metallic, including two or three blackish marks. Hindwings fuscous, darker posteriorly.

Britain to the Clyde, rather common; C. Europe, WC. Asia to N. Persia; 6. Larva pale reddish; head blackish; plate of 2 pale ochreous: in fruits of plum and blackthorn; 8, 9.

4. **E. hypericana**, *Hb.* 14-17 mm. Forewings elongate, ferruginous-orange, sometimes brownish-tinged, darker posteriorly; costa posteriorly with fine darker and leaden-metallic streaks; ocellus edged with pale golden-metallic, including two or three black marks. Hindwings light grey; 3 and 4 often separate.

England to York, E. Ireland, common; C. Europe, Asia Minor; 6, 7. Larva blackish-brown or grey; head light brown; plate of 2 black: in spun shoots of *Hypericum perforatum;* 4, 5.

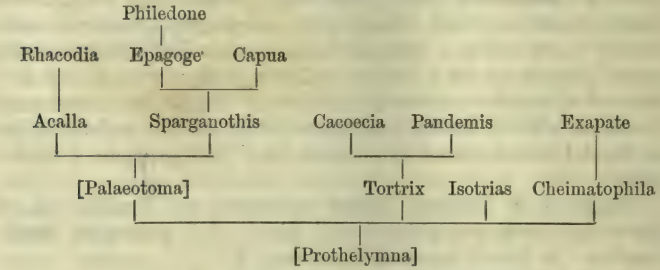
2. TORTRICIDAE.

Forewings: 2 from before $\frac{3}{4}$ of lower margin of cell, 9 separate. Hindwings: lower median vein not hairy towards base (except *Sparganothis*). Uncus developed.

This large family is nearly equally plentiful everywhere. The species are of rather small size. Forewings with central fascia oblique, running from about middle of costa to dorsum before tornus; ocellus absent; costal patch usually defined.

Two exotic genera are introduced (in brackets) into the diagram to explain the phylogeny.

Phylogeny of Tortricidae.


Philedone
Rhacodia
Epagoge
Capua
Acalla
Sparganothis
Cacoecia
Pandemis
Exapate
[Palaeotoma]
Tortrix
Isotrias
Cheimatophila
[Prothelymna]

Tabulation of Genera.

1. Forewings with 7 and 8 stalked . . . 2.
„ „ „ separate . . . 5.
2. Lower margin of cell of hindwings basally hairy
6 Sparganothis
„ „ „ „ naked . 3.
3. Forewings in ♂ with costal fold . . 5. Capua
„ „ without costal fold . . . 4.
4. Antennae in ♂ bipectinated . . 3. Philedone.
„ „ ciliated . . . 4. Epagoge.
5. Forewings with 7 to costa . . . 6.
„ „ to termen or apex . . . 7.
6. Costa of forewings emarginate beyond middle
1. Rhacodia.
„ „ not emarginate . 2. Acalla.
7. Forewings in ♂ with costal fold . . 7. Cacoecia.
„ „ without costal fold . . 8.
8. Antennae in ♂ with deep notch near base 8 Pandemis.
„ „ without notch . . . 9.

9. Hindwings with 6 and 7 remote at base . 10. ISOTRIAS.
„ „ „ closely approximated or stalked . . 10.
10. Hindwings with 4 absent . . 12. CHEIMATOPHILA.
„ „ present . . . 11.
11. Tongue absent . . . . 11. EXAPATE.
„ present . . . . 9. TORTRIX.

1. RHACODIA, *Hb.*

Antennae in ♂ shortly ciliated. Palpi moderately long, porrected. Thorax with longitudinal posterior crest. Forewings without costal fold, costa broadly emarginate beyond middle, surface with slight scale-tufts; 7 to costa. Hindwings: 3 and 4 connate, 5 closely approximated to 4, 6 and 7 closely approximated towards base.

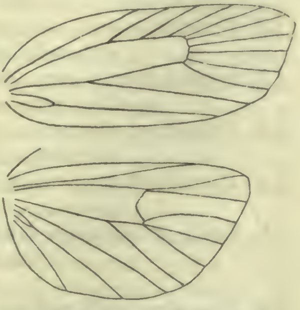
There is but one species.

1. **R. caudana**, *F.* 17-21 mm. Forewings pale ochreous, deep reddish-ochreous, or brown, striated and veined with dark fuscous or ferruginous; dorsum sometimes deep ferruginous; central fascia and costal patch dark fuscous, more or less confluent, sometimes obsolete. Hindwings light grey, strigulated with darker; apex sometimes ochreous-tinged.

Britain to the Orkneys, Ireland, common; N. and C. Europe, N. America; 8. Larva pale green; head pale yellowish: on *Salix*; 5, 6.

2. ACALLA, *Hb.*

Antennae in ♂ shortly ciliated. Palpi moderately long, porrected. Thorax sometimes with posterior crest. Forewings without costal fold, surface usually with scale-tufts; 3 and 4 sometimes stalked, 7 to costa. Hindwings: 3 and 4 connate or short-stalked, 5 approximated to 4, 6 and 7 closely approximated towards base.


Neuration of *Acalla variegana.*

A genus of some extent, apparently entirely confined to northern temperate regions. Imago with forewings often very oblong, the costa being usually strongly arched towards the base. The species are often so remarkably variable (probably *A. cristana* and *A. hastiana* are the most variable known *Lepidoptera*), that they are difficult to understand without considerable experience; and the specific distinctness of certain forms is still not satisfactorily ascertained. Hence a tabulation of the species is more than usually troublesome to make, and more than usual caution will be required in its application.

1. Apex of forewings appearing subfalcate 19. *contaminana*.
,, ,, not appearing subfalcate . 2.
2. Forewings green . . . . . 6. *literana*.
,, not green . . . . . 3.
3. Forewings with triangular white costal spot 24. *holmiana*.
,, without such spot . . . 4.
4. Head dark, thorax pale . . . . 5.
Head and thorax concolorous . . . 6.
5. Hindwings whitish-fuscous, forewings reddish-ochreous . . . 14. *permutana*.
,, grey, forewings ochreous to blackish 13. *variegana*.
6. Forewings with extremely large central tuft 1. *cristana*.
,, with central tuft not extremely large . 7.
7. Costa of forewings distinctly roughened with scales 8.
,, ,, not roughened with scales . 13.
8. Termen of forewings sinuate . . . 9.
,, ,, not sinuate . . . 12.
9. Termen of forewings moderately oblique . 10.
,, ,, little oblique . 12. *logiana*.
10. Costa of forewings faintly concave . 2. *hastiana*.
,, ,, not concave . . . 11.
11. Forewings with large submedian tuft . 3. *umbrana*.
,, with tufts all slight . . 5. *sponsana*.
12. Species larger, grey-whitish . . 7. *niveana*.
,, smaller, grey or white . . 8. *boscana*.
13. Forewings with one or more tufts well-marked . 14.
,, with tufts all slight or absent . . 17.
14. Hindwings grey-whitish . . 20. *shepherdana*.
,, grey . . . . . 15.
15. Costa of forewings faintly concave; species larger 16.
,, ,, faintly convex; species smaller 17. *comariana*.
16. Forewings pale reddish-brown to dark fuscous 15. *perplexana*.
,, ochreous-grey to ochreous-brown 16 *schalleriana*.

17. Termen of forewings moderately oblique . . 18.
,, ,, little oblique . . 19.
18. Forewings narrowed anteriorly . . 10. *maccana.*
,, oblong . . . 22. *caledoniana.*
19. Forewings without tufts . . 18. *lorquiniana.*
,, with slight tufts . . . 20.
20. Termen of forewings hardly sinuate . . 21.
,, ,, distinctly sinuate . . 22.
21. Forewings with variable markings, costa usually whitish . . . 4. *rufana.*
,, without defined markings, costa not whitish . . . 11. *lipsiana.*
22. Forewings with ground-colour grey-whitish 9. *mixtana.*
,, ,, ,, not whitish . 23.
23. Species smaller; costal blotch paler-centred 23. *aspersana.*
,, larger; costal blotch forming three spots 21. *ferrugana.*

1. **A. cristana,** *F.* 18-21 mm. Thorax with strong longitudinal crest. Forewings reddish-ochreous to dark brown, sometimes bicolorous; a very large sometimes white scale-tuft in middle of disc; sometimes a white or pale ochreous dorsal streak, or an orange central longitudinal streak; sometimes two fascia-like whitish streaks from costa converging to middle of disc. Hindwings grey, apex darker.

S. England to Hereford and Norfolk, Ireland, local; C. Europe; 8-5. Larva on rose and hawthorn; 6, 7.

2. **A. hastiana,** *L.* 18-21 mm. Thorax with strong longitudinal crest. Forewings oblong, grey, ochreous-brown, or dark purplish-fuscous; tufts slight; veins sometimes pale, seldom broadly whitish-ochreous; edge of basal patch sometimes dark-marked; central fascia and costal patch confluent, darker or red-brown, often obsolete; sometimes a white subcostal streak edged beneath with blackish, or an ochreous and ferruginous median longitudinal streak, or dorsum broadly whitish-ochreous. Hindwings light grey, somewhat darker-strigulated.

Britain to the Orkneys, N. and C. Ireland, rather local; Europe, N. Asia, N. America; 9-5. Larva pale green; head and plate of 2 often brownish-tinged, sometimes black: on *Salix;* 7-9. Occasionally a partial early brood of larvae in 5 and imagos in 6.

3. **A. umbrana,** *Hb.* 18-21 mm. Thorax with strong longitudinal crest. Forewings suboblong, light brown; a large scale-

tuft on submedian fold before middle, and some smaller ones posteriorly; a darker or blackish median longitudinal streak to apex, marked with a pale spot in middle, somewhat branched posteriorly. Hindwings light grey.

Sussex, Surrey, Hants, Lancashire to Northumberland, local; N. and C. Europe; 8-10. Larva on hawthorn; 6, 7.

4. **A. rufana**, *Schiff.* (*autumnana*, Hb.) 18-21 mm. Thorax with slight posterior crest. Forewings suboblong, light yellow-ochreous to dark grey; tufts slight; costa usually suffused with whitish from base to beyond middle; sometimes a grey or fuscous triangular blotch on costa posteriorly, and a dorsal spot towards base; sometimes a ferruginous central longitudinal streak to apex. Hindwings pale grey, apex darker.

Britain to the Clyde, E. Ireland, local; C. Europe; 8-10. Larva dark grey, blackish, or blackish-green; head black or dark brown; plate of 2 black: on *Myrica*, *Salix*, and white poplar; 6-8.

5. **A. sponsana**, *F.* (*favillaceana*, Hb.) 20-22 mm. Thorax with slight posterior crest. Forewings oblong, grey or whitish-grey, faintly darker-striated; tufts slight; base and scattered striae sometimes ferruginous; usually a large darker or ferruginous triangular blotch on costa posteriorly. Hindwings light grey, apex darker.

Britain to Caledonian Canal, E. Ireland, common; C. Europe; 8-10. Larva green: on beech; 6, 7.

6. **A. literana**, *L.* 18-20 mm. Thorax with strong posterior crest. Forewings oblong, pale green, sometimes mixed or strigulated with grey; tufts numerous; usually some irregular scattered black marks; sometimes with ochreous spots or suffusions in disc, or suffused blackish spots. Hindwings grey, darker towards apex.

Britain to the Clyde, S. Ireland, rather local; C. Europe, N. Asia; 8-4. Larva on oak (?); 6.

7. **A. niveana**, *F.* (*treveriana*, Hb.; *scotana*, Wilk.) 18-21 mm. Forewings oblong, grey-whitish, more or less strigulated and spotted with grey towards margins, sometimes reddish-tinged; tufts numerous; some scattered black scales; usually two darker sometimes black-marked spots on costa before and beyond middle, and a third in middle of disc; sometimes a reddish dorsal spot towards base. Hindwings pale grey, darker towards apex.

Perth to Ross, local; C. Europe, N. America; 9-4. Larva on birch; 6, 7.

8. **A. boscana,** *F.* (*scabrana,* Stph.; *parisiana,* Gn.) 15-18 mm. Forewings oblong, white, ochreous-whitish, or grey; tufts numerous; two dark reddish-grey spots on costa before and beyond middle, and a third in middle of disc usually containing a black elongate mark, these sometimes confluent. Hindwings light grey, darker towards apex.

Kent to Devon, Worcester, York, local; C. and S. Europe, N. America; 7, 9, 10. Larva green: on elm; 5, 6, 8, 9.

9. **A. mixtana,** *Hb.* 14-17 mm. Forewings rather narrowed anteriorly, grey-whitish, irregularly and variably mixed with red-brown; tufts very slight; central fascia (often interrupted or incomplete) and costal patch usually red-brown; often some small scattered blackish spots. Hindwings grey.

Britain to Ross, rather common; C. Europe; 9-4. Larva yellow-green; dorsal line darker; head yellowish-brown: on *Calluna;* 7, 8.

10. **A. maccana,** *Tr.* 19-21 mm. Forewings narrowed anteriorly, ochreous-brownish, mixed and sometimes suffused with whitish; tufts slight; some scattered ferruginous strigulae; central fascia and costal patch usually darker, anterior edge of fascia deep ferruginous, usually obsolete dorsally. Hindwings pale grey.

Lancashire to Ross, N. Ireland, local; N. Europe, N. America; 8-10. Larva on *Vaccinium;* 6.

11. **A. lipsiana,** *Schiff.* 17-20 mm. Forewings suboblong, grey, variably mixed with light red-brown, sometimes suffused with red-brown except costa; tufts very slight; usually some transverse series of dark grey dots. Hindwings pale grey.

Lancashire, Westmoreland, Perth, Aberdeen, local; C. Europe; 8, 9. Larva on *Vaccinium;* 6.

12. **A. logiana,** *Schiff.* (*tristana,* Hb.) 15-18 mm. Forewings oblong, whitish, ochreous, fuscous, or reddish-brown; tufts small, rather numerous; usually some ochreous-brown and black dots; upper half of central fascia and costal patch dark reddish-fuscous or blackish, more or less wholly confluent to form a triangular blotch. Hindwings grey.

England to York, Argyll, E. Ireland, rather common; C. Europe, N. America; 9-11. Larva pale yellowish or yellow-greenish; dorsal line darker; head pale yellowish: on *Viburnum lantana;* 6-9.

13. **A. variegana,** *Schiff.* 13-16 mm. Head dark fuscous, thorax lighter brownish or whitish. Forewings oblong, white, whitish-ochreous, brownish, or blackish, usually with basal half

before central fascia white or whitish-ochreous, rest dark; a large scale-tuft on submedian fold before middle, and smaller ones posteriorly; sometimes a suffused dark dorsal spot at $\frac{1}{3}$, or a large dark triangular costal blotch posteriorly. Hindwings grey, faintly darker-strigulated.

Britain to the Orkneys, N. and E. Ireland, common; Europe; 7-9. Larva pale green or yellowish; dorsal line darker green or red-brown; head yellowish-brown: on hawthorn, blackthorn, rose, etc.; 6, 7.

14. **A. permutana,** *Dup.* 14-17 mm. Head dark brown, thorax whitish-ochreous. Forewings oblong, reddish-ochreous; basal half before central fascia whitish-ochreous with a few darker strigulae, enclosing a triangular dark reddish-fuscous dorsal spot mixed with leaden-grey, with scale-tuft in its apex; central fascia brown, posteriorly undefined, with small scale-tufts on anterior edge, one in middle larger; costal patch reddish-fuscous, connected beneath with termen. Hindwings whitish-fuscous.

Surrey, Caernarvon to Lancashire, E. Ireland, local; SE. Europe, N. America; 8, 9. Said to frequent *Rosa spinosissima.*

15. **A. perplexana,** *Barr.* 15-18 mm. Forewings oblong, pale reddish-brown, fuscous, or dark fuscous, darker-strigulated; tufts slight, a larger one in middle of disc; edge of basal patch darker dorsally; a large triangular red-brown or blackish-fuscous blotch on costa, anterior edge deep red-brown, sometimes with extension of central fascia to dorsum. Hindwings pale grey.

Norfolk, Hereford to Pembroke, Lancashire to the Clyde, N. Ireland, local; not recognised elsewhere; 7, 8. Larva green-whitish; dorsal line green; head and plate of 2 pale brown: on hawthorn, blackthorn, bramble, etc.; 6. The specific distinctness of this form is as yet doubtful.

16. **A. schalleriana,** *L.* (*comparana,* Hb.) 15-18 mm. Forewings oblong, ochreous-grey to ochreous-brown, sometimes darker-strigulated; a moderately large tuft on submedian fold before middle, one in middle of disc, and scattered smaller tufts, often black; edge of basal patch sometimes darker dorsally; a large triangular red-brown or dark fuscous blotch on costa, sometimes whitish-edged anteriorly. Hindwings grey.

Britain to Caledonian Canal, N. and E. Ireland, common; C. Europe, N. America; 8, 9. Larva green; head brownish: on *Salix caprea;* 6.

17. **A. comariana,** *Z.* (*proteana,* HS.; *potentillana,* Cooke).

15-16 mm. Forewings oblong, grey, sometimes tinged with ochreous or reddish, distinctly darker-strigulated; tufts small, numerous, sometimes partly black; edge of basal patch darker dorsally; a large triangular red-brown, dark fuscous, or blackish-grey blotch on costa, sometimes with indistinct extension of central fascia to dorsum. Hindwings grey or pale grey.

Dorset, Norfolk, Lancashire, York, Aberdeen, N. Ireland, local; C. Europe; 7, 9. Larva pale green or whitish; dorsal and subdorsal lines sometimes darker; head and plate of 2 pale yellow-brown or black: on *Comarum*, *Fragaria*, etc.; 5, 6, 8.

18. **A. lorquiniana**, *Dup.* (*uliginosana*, Westw.) 14-17 mm. Forewings suboblong, brownish-ochreous, with scattered black scales; tufts absent; a blackish spot in disc beyond middle, sometimes reduced to two or three dots. Hindwings whitish-ochreous, more or less grey-tinged.

Norfolk to Hunts, local, in fens; WC. Europe; 6, 8, 9. Larva yellowish-green; dorsal and subdorsal lines darker; head brownish-tinged: on flowers and leaves of *Lythrum salicaria;* 5, 7, 8.

19. **A. contaminana**, *Hb.* 14-19 mm. Forewings suboblong, apex rather strongly prominent, whitish-ochreous to reddish-ochreous, sometimes much mixed with fuscous, strigulated with dark fuscous or ferruginous, veins dark fuscous; tufts very slight; edge of basal patch usually dark fuscous, angulated; central fascia and costal patch often rather dark fuscous, sometimes united in disc; apical half of cilia white on upper part of termen. Hindwings grey-whitish, indistinctly strigulated with grey.

Britain to the Orkneys, N. and E. Ireland, common; C. Europe; 8-10. Larva pale green-yellowish; head pale brown; anal plate green: on hawthorn, blackthorn, apple, etc.; 6.

20. **A. shepherdana**, *Stph.* 13-15 mm. Forewings reddish-brown, darker-strigulated; a small ridge-like tuft of whitish scales in middle of disc, and some other slight scattered tufts, sometimes black, mainly in three transverse series. Hindwings grey-whitish, fuscous-tinged posteriorly, indistinctly strigulated with grey.

Dorset, Suffolk, Norfolk, Cambridge, Lancashire, local; not recorded elsewhere; 7, 8. Larva green, whitish, or pale yellowish; head pale brownish: on *Spiraea ulmaria;* 5, 6.

21. **A. ferrugana**, *Tr.* 14-18 mm. Forewings suboblong, pale ochreous to deep reddish-ochreous, darker-strigulated, sometimes strewn with blackish dots; tufts slight; two costal spots

before and beyond middle and one in middle of disc grey, brownish, red-brown, or blackish. Hindwings whitish-grey, towards apex darker or grey-strigulated.

Britain to the Hebrides, Ireland, common; N. and C. Europe, N. America; 8-10. Larva pale green; dorsal line darker; head black or brown, plate of 2 more or less black: on birch; 6. There is said to be sometimes a partial early brood of imagos in 6, perhaps from autumnal larvae.

22. **A. caledoniana,** *Stph.* 13-15 mm. Forewings suboblong, dark ferruginous-fuscous, obscurely darker-strigulated; tufts slight; central fascia and costal patch sometimes faintly indicated. Hindwings grey.

Kent, Dorset, Hereford to the Orkneys, common northwards; not recognised elsewhere; 7, 8. Larva on *Alchemilla alpina;* 6.

23. **A. aspersana,** *Hb.* 11-15 mm. Forewings suboblong, ochreous-yellowish to ferruginous, darker-strigulated; tufts slight; base of costa usually ferruginous-suffused; a spot on dorsum at $\frac{1}{3}$, and a triangular paler-centred costal blotch deeper ochreous, ferruginous, or mixed with dark grey. Hindwings pale grey, darker towards apex.

Britain to Caledonian Canal, N. and E. Ireland, locally plentiful; C. Europe; 7, 8. Larva green; head light brown; plate of 2 brown or green, sometimes black-edged: on *Spiraea, Poterium, Potentilla,* etc.; 5, 6.

24. **A. holmiana,** *L.* 12-14 mm. Forewings suboblong, deep orange-ferruginous, yellower towards dorsum anteriorly, suffusedly streaked transversely with pale violet, sometimes mixed posteriorly with whitish and blackish scales; tufts absent; a triangular white often black-edged costal blotch beyond middle; cilia ochreous-yellowish, on tornus dark grey. Hindwings grey, darker posteriorly.

Britain to the Clyde, N. Ireland, common; C. Europe; 7, 8. Larva yellowish; head pale brown: on rose, apple, etc.; 5, 6.

3. PHILEDONE, *Hb.*

Antennae in ♂ bipectinated, pectinations sometimes very short and terminating in fascicles of long cilia. Palpi moderately long, porrected. Thorax smooth. Forewings without costal fold; 7 and 8 stalked, 7 to termen. Hindwings: 3 and 4 approximated, connate, stalked, or coincident, 5 somewhat approximated to 4, 6 and 7 approximated or stalked.

Includes only a very few northern temperate species.

Forewings ochreous-grey or whitish . 1. *prodromana.*
„ yellow-ochreous . . . 2. *gerningana.*

1. **P. prodromana,** *Hb.* (*walkerana,* Curt.) 13-16 mm. Antennal pectinations very short, ending in very long tufts of cilia. Forewings ochreous-grey, more or less whitish-suffused, sometimes strigulated with ochreous-brown; basal area darker, undefined, reddish-mixed; central fascia and costal patch grey mixed with red-brown and blackish. Hindwings rather dark grey.

Cheshire to the Clyde, on heaths, local; C. Europe; 4, 5. Larva on *Potentilla;* 7, 8.

2. **P. gerningana,** *Schiff.* 13-16 mm. Antennal pectinations moderately long. Forewings yellow-ochreous, darker-strigulated; basal area browner, undefined; broad central fascia and costal patch red-brown. Hindwings rather dark grey.

Kent, Pembroke, Hereford to the Shetlands, E. Ireland, on heaths, local; C. Europe; 7, 8. Larva dull greenish; head reddish-ochreous: on *Potentilla, Statice, Vaccinium,* etc.; 5, 6.

4. Epagoge, *Hb.*

Antennae in ♂ moderately ciliated. Palpi moderate, porrected. Thorax with posterior crest. Forewings without costal fold; 7 and 8 stalked, 7 to termen. Hindwings: 3 and 4 connate, 5 approximated to 4, 6 and 7 stalked.

A rather limited genus, most numerous in Australia.

Hindwings dark grey . . . 2. *grotiana.*
„ more or less whitish . . 1. *gnomana.*

1. **E. gnomana,** *Cl.* 16-18 mm. Forewings pale ochreous, sometimes faintly strigulated with brown; central fascia reddish-ochreous-brown, angulated first outwards and then inwards, usually obsolete in disc; costal patch brown; termen subsinuate. Hindwings whitish, sometimes partially greyish-tinged.

Has occurred, but locality unknown; C. and S. Europe; 7. Larva on *Stachys sylvatica;* 5, 6.

2. **E. grotiana,** *F.* 13-16 mm. Forewings ochreous, strigulated with fuscous or red-brown; basal patch, central fascia, and costal patch fuscous or red-brown, fascia sometimes interrupted; termen nearly straight. Hindwings dark grey.

England to York, local; C. Europe; 7.

5. Capua, *Stph.*

Antennae in ♂ moderately or strongly fasciculate-ciliated.

Palpi moderate, porrected or subascending. Thorax sometimes with posterior crest. Forewings in ♂ with strong costal fold; 7 and 8 stalked, 7 to termen. Hindwings: 3 and 4 connate, 5 approximated to 4, 6 and 7 stalked.

Fairly numerous in Australia, elsewhere represented by very few species.

Forewings with ferruginous markings .	1. *angustiorana.*
,, without ferruginous markings	2. *favillaceana.*

1. **C. angustiorana,** *Hw.* 12-17 mm. Forewings ferruginous ochreous, blackish-mixed in disc posteriorly; base and costal fold in ♂ dark brown; a ferruginous-brown oblique mark from dorsum near base; central fascia and costal patch deep ferruginous, often separated by a whitish suffusion on costa, patch extended as a fascia to tornus. Hindwings blackish-grey, in ♀ lighter anteriorly.

Britain to the Clyde, Ireland, plentiful in gardens; WC. and S. Europe, N. Africa; 7. Larva greenish-yellowish; head and plate of 2 green or light brown: on yew, apple, etc.; 5.

2. **C. favillaceana,** *Hb.* (*ochraceana,* Stph.) 13-16 mm. Forewings light greyish-ochreous, obscurely strigulated with grey; base, central fascia, and costal patch indistinctly darker, fascia darkest towards costa. Hindwings pale grey.

England, E. and S. Ireland, local; C. Europe; 5, 6. Larva on *Carpinus;* 7.

6. SPARGANOTHIS, *Hb.*

Antennae in ♂ moderately ciliated. Palpi very long, porrected. Thorax smooth. Forewings in ♂ with very slight costal fold; 7 and 8 stalked, 7 to termen. Hindwings with lower margin of cell hairy towards base; 3 and 4 closely approximated, 5 approximated to 4, 6 and 7 closely approximated or short-stalked.

Includes only the single species.

1. **S. pilleriana,** *Schiff.* 16-22 mm. Forewings ochreous, often brassy-tinged, sometimes posteriorly brownish-strigulated; a brown dorsal spot at $\frac{1}{3}$; central fascia and costal patch brown, latter often extended as an irregular fascia to tornus; sometimes a brown terminal streak. Hindwings grey.

I. of Wight, Hants to Devon, local; C. Europe, WC. Asia to N. Persia, N. America; 7. Larva pale green or grey; dorsal line sometimes darker; tubercular spots white or dark; head and plate of 2 black: on *Statice, Stachys, Narthecium,* etc.; 9-5. Abroad the species is destructive to the vine.

7. Cacoecia, *Hb.*

Antennae in ♂ moderately ciliated. Palpi moderate or rather long, ascending or porrected. Thorax sometimes with posterior crest. Forewings in ♂ with costal fold; 7 to termen. Hindwings: 3 and 4 connate or closely approximated, 5 approximated to 4, 6 and 7 closely approximated or stalked.

A large genus of nearly universal distribution.

1. Forewings with leaden-metallic lines, hindwings blackish . . . 12. *lecheana.*
„ without metallic lines, hindwings not blackish . . . . 2.
2. Hindwings whitish or light grey . . . 3.
„ with ground-colour grey . . . 5.
3. Central fascia darkest towards costa . 9. *costana.*
„ „ not darker on costa . . 4.
4. Hindwings with costal half whitish 10. *semialbana.*
„ wholly light grey . . 8. *lafauryana.*
5. Forewings with dark apical spot . . . 6.
„ without dark apical spot . . 8.
6. Forewings with a dark blotch above tornus . 7.
„ with a stria or streak only . 2. *podana.*
7. Costal patch connected with central fascia 5. *xylosteana.*
„ „ not connected with central fascia 1. *piceana.*
8. Anterior edge of central fascia nearly straight . 9.
„ „ „ „ angulated or sinuate 11.
9. Forewings reddish-ochreous . 11. *unifasciana.*
„ not reddish-ochreous . . . 10.
10. Edge of basal patch straight . . 7. *sorbiana.*
„ „ „ angulated . . 13. *musculana.*
11. Costal patch sending a narrow fascia to termen 4. *crataegana.*
„ „ without such extension . . 12.
12. Anterior edge of central fascia abruptly emarginate 3. *decretana.*
„ „ „ not emarginate . 6. *rosana.*

1. **C. piceana,** *L.* 20-25 mm. Forewings with termen sinuate, vertical, costal fold short, basal; light red-brown, purplish-brown, or purplish-ochreous, in ♀ thinly strigulated with dark fuscous; basal patch dark red-brown dorsally, in ♂ suffused costally with grey, edge in ♀ oblique; central fascia,

costal patch, an irregular blotch connected with termen and tornus, and an apical terminal mark dark red-brown. Hindwings fuscous, in ♀ more or less orange towards apex.

Surrey to Dorset, local and uncommon; C. Europe, N. Asia; 7. Larva grey-green; head and plate of 2 brown: on *Pinus*; 5, 6.

2. **C. podana**, *Sc.* (*pyrastrana*, Hb.; *fulvana*, Wilk.) 19-26 mm. Thorax crested. Forewings with termen sinuate, vertical, costal fold short, basal; red-brownish or ochreous, in ♀ strigulated with dark brown; in ♂ a dark red-brown dorsal spot near base, above which is a grey and whitish suffusion; central fascia in ♂ dark red-brown, in ♀ brownish or outlined only, anterior edge nearly straight; costal patch, an apical terminal mark, and a stria (in ♂ thickened) from tornus dark red-brown. Hindwings grey, apex broadly orange.

Britain to the Clyde, E. Ireland, common; C. Europe, N. Asia; 7. Larva green; dorsal line sometimes darker; head and plate of 2 brown or black: on oak, bramble, etc.; 5, 6.

3. **C. decretana**, *Tr.* 20-26 mm. Thorax crested. Forewings with termen sinuate, vertical, costal fold short, basal; ochreous or reddish-ochreous, sometimes faintly darker-strigulated, in ♂ light brown-reddish anteriorly; markings deep ferruginous; in ♂ a dorsal spot near base, above which are some pale greyish-ochreous scales; central fascia with anterior edge emarginate in middle, almost interrupted; costal patch ill-defined. Hindwings grey, in ♂ with costal half ochreous-whitish, more ochreous posteriorly, in ♀ with apex broadly pale ochreous-yellowish.

Norfolk (King's Lynn), very local; C. Europe; 8. Larva yellow-brownish or green-brownish, sides paler; head and plate of 2 brown: on *Myrica*; 6.

4. **C. crataegana**, *Hb.* (*roborana*, Hb.) 18-24 mm. Forewings with termen sinuate, vertical, costal fold from base to $\frac{2}{5}$, irregular; light brown or ochreous-brown; a transverse dorsal spot near base, central fascia with anterior edge angulated below middle, and costal patch extended as a streak to termen above tornus dark ochreous-brown; fascia attenuated and sometimes obsolete towards costa. Hindwings grey, apex in ♀ sometimes yellowish.

England to York, S. Ireland, local; C. Europe; 7. Larva on sycamore and *Salix*; 5, 6.

5. **C. xylosteana**, *L.* 15-22 mm. Forewings with termen sinuate, vertical, costal fold from base to $\frac{3}{5}$, irregular; ochreous,

more or less fuscous-tinged, paler towards costa; a transverse dorsal spot near base, central fascia with anterior edge sinuate, costal patch broadly connected with it near costa, a blotch from above tornus sometimes connected with costal patch, and an apical spot dark ferruginous-brown. Hindwings grey, apex sometimes yellowish-tinged.

Britain to the Clyde, Moray, E. Ireland, common; C. and S. Europe; 7. Larva whitish-grey or pale greenish; head black; plate of 2 black, anterior edge white: on oak, elm, blackthorn, etc.; 5.

6. **C. rosana**, *L.* 15-20 mm. Forewings with termen sinuate, vertical, costal fold from base to beyond middle, irregular; light brown, sometimes reddish-tinged, in ♀ darker-strigulated; a dorsal spot near base, central fascia with anterior edge sinuate, and suffused costal patch emitting an interrupted stria darker brown, in ♀ sometimes nearly obsolete; some dark terminal strigulae. Hindwings grey, apex usually more or less orange.

Britain to the Hebrides, E. Ireland, plentiful; N., C., and SW. Europe, N. America; 7. Larva dark olive-green; dorsal line darker; tubercular spots white; head brown; plate of 2 blackish, anteriorly whitish: on rose, *Salix*, ash, etc.; 5, 6.

7. **C. sorbiana**, *Hb.* 22-28 mm. Forewings with termen hardly sinuate, vertical, costal fold short, not reaching base; light greyish-ochreous, slightly brownish-tinged; basal patch with straight oblique edge, central fascia with anterior edge straight, almost interrupted above middle, and costal patch brown. Hindwings grey.

England to York, common; C. Europe; 6, 7. Larva dark grey or olive-green; tubercular spots white; head black; plate of 2 brown, blackish-marked, anterior edge white: on oak, birch, hazel, etc.; 5, 6.

8. **C. lafauryana**, *Rag.* 22-25 mm. Forewings with termen straight, vertical, costal fold short, not reaching base; in ♂ light or deep yellow-ochreous, in ♀ from pale ochreous to light brown-reddish, more or less strigulated with darker or brown; a partially marked basal patch with very oblique edge, central fascia interrupted above middle and with anterior edge excavated near dorsum, costal patch, and incomplete posterior stria darker or red-brown. Hindwings light grey.

Norfolk (King's Lynn), very local; France, Holland; 7, 8. Larva green; dorsal line darker; head yellowish-green; plate of 2 darker green: on *Myrica*; 6, 7.

9. **C. costana**, *F.* (*latiorana*, Stt.) 15-22 mm. Forewings

with termen hardly sinuate, nearly vertical, costal fold from base to before middle; in ♂ whitish-ochreous, in ♀ ochreous and sometimes reddish-tinged, more or less strigulated with dark fuscous; basal patch small, somewhat yellower; central fascia pale brownish, towards costa dark brown; costal patch dark brown. Hindwings in ♂ whitish, in ♀ grey-whitish with greyer termen.

Britain to the Clyde, N. Ireland, common in marshy places; C. Europe; 7. Larva dark grey-green or brownish-green; tubercular spots whitish; head and plate of 2 black: on *Epilobium*, *Comarum*, *Centaurea*, etc.; 5, 6.

10. **C. semialbana**, *Gn.* 18-20 mm. Forewings with termen hardly sinuate, nearly vertical, costal fold from base to before middle; pale ochreous, somewhat brownish-strigulated; basal patch brownish dorsally; central fascia ochreous-brown, anterior edge nearly straight; costal patch ochreous-brown, emitting a straight stria. Hindwings whitish, apex ochreous-tinged, dorsal half light grey.

Kent to Hants, Essex, local and scarce; C. and SE. Europe; 7. Larva grey-green; head and plate of 2 brown: on beech and *Lonicera*; 5, 6.

11. **C. unifasciana**, *Dup.* 13-18 mm. Forewings with termen almost straight, slightly oblique, costal fold from base to beyond middle, irregular; reddish-ochreous, darker or ferruginous posteriorly; edge of basal patch dark fuscous on dorsum; central fascia ferruginous, often faint, dorsal extremity dark fuscous, anterior edge nearly straight. Hindwings grey.

Britain to Caledonian Canal, E. Ireland, very common in gardens; C. and S. Europe; 6, 7. Larva on privet (*Ligustrum*); 5.

12. **C. lecheana**, *L.* 15-23 mm. Forewings with termen nearly straight, rather oblique, costal fold from base to middle, strong; dark fuscous, more or less densely irrorated or suffused with ferruginous-ochreous; edges of central fascia and apex of costal patch more or less defined by leaden-metallic lines. Hindwings blackish-grey.

Britain to the Clyde, Ireland, common; C. Europe, Asia Minor; 6, 7. Larva light green, above blackish-green; spots pale; head light brown: on oak, *Salix*, maple, etc.; 5.

13. **C. musculana**, *Hb.* 15-20 mm. Forewings with termen slightly rounded, rather oblique, costal fold short, not reaching base; brown, suffusedly mixed with whitish, somewhat strigulated with dark fuscous; edge of basal patch dark fuscous,

angulated; central fascia dark brown, sometimes reddish-tinged, anterior edge slightly irregular, blackish; costal patch dark fuscous, emitting an irregular stria. Hindwings grey.

Britain to the Shetlands, Ireland, common; Europe, N. America; 5, 6. Larva blackish-green; spots pale flesh-colour; head and plate of 2 brown: on *Rubus*, oak, etc.; 8, 9.

8. Pandemis, *Hb.*

Antennae in ♂ moderately ciliated, with deep notch above near base. Palpi moderately long, porrected. Thorax smooth. Forewings without costal fold; 7 to termen. Hindwings: 3 and 4 connate or closely approximated, 5 approximated to 4, 6 and 7 closely approximated towards base.

Contains only a few northern temperate species.

1. Apex of hindwings whitish-ochreous . 1. *corylana*.
,, not whitish-ochreous . . 2.
2. Forewings reddish-tinged . . . . 3.
,, not reddish-tinged . . 2. *ribeana*.
3. Face white . . . 4. *cinnamomeana* ♂.
,, not white . . . . . 4.
4. Extreme apex of hindwings reddish-ochreous
4. *cinnamomeana* ♀.
,, ,, not reddish-ochreous
3. *heparana*.

1. **P. corylana**, *F.* 18-24 mm. Face sometimes whitish. Forewings pale yellowish-ochreous, strigulated with ochreous-brown or dark brown, veins dark brown; basal patch, central fascia, and costal patch outlined with dark brown; cilia dark brown. Hindwings light grey, apex suffusedly whitish-ochreous.

Britain to Ross, N. Ireland, rather common; C. Europe; 7. Larva green; dorsal line darker; head pale green: on hazel, *Cornus*, ash, etc.; 5, 6.

2. **P. ribeana**, *Hb.* (*cerasana*, Hb.) 16-23 mm. Forewings light ochreous or brownish, sometimes indistinctly darker-strigulated; basal patch, central fascia, and costal patch slightly darker or fuscous, usually outlined with dark brown; cilia deep ochreous or brown. Hindwings rather dark grey.

Britain to Caledonian Canal, common in gardens, scarcer northwards; C. Europe, N. Asia; 6, 7. Larva light green; dorsal line darker; head green, sometimes brown-spotted; plate of 2 green: on hazel, cherry, elm, etc.; 5.

3. **P. heparana**, *Schiff.* 16-22 mm. Face reddish-fuscous. Forewings reddish-fuscous; basal patch, central fascia, and

costal spot darker, anterior edge of fascia somewhat bent. Hindwings rather dark grey.

Britain to the Clyde, N. and E. Ireland, common; C. Europe; 7. Larva bright green; dorsal line darker; head pale green or pale yellowish, posteriorly sometimes black-dotted: on elm, *Salix*, blackthorn, etc.; 5, 6.

4. **P. cinnamomeana**, *Tr.* 18-24 mm. Face in ♂ white, in ♀ reddish-ochreous. Forewings deep reddish-ochreous or reddish-brown; basal patch, central fascia, and costal patch darker; anterior edge of fascia straight. Hindwings rather dark grey, extreme apex in ♀ tinged with reddish-ochreous.

England to York, local; C. Europe; 7. Larva green; head pale yellowish: on larch, birch, etc.; 5, 6.

9. Tortrix, *L.*

Antennae in ♂ sometimes dentate, moderately or shortly ciliated, rarely simple. Palpi moderate or rather long, porrected or ascending. Thorax smooth or crested. Forewings without costal fold, surface rarely with slight scale-tufts; 7 to termen or apex. Hindwings: 3 and 4 connate or closely approximated, sometimes stalked, 5 more or less approximated to 4, 6 and 7 closely approximated towards base or stalked.

A very large and universally distributed genus. The group of grey species allied to *virgaureana* is a difficult one, and requires careful study.

1. Forewings reticulated with orange . . 2.
,, not reticulated with orange . . 3.
2. Forewings with two pale purplish transverse streaks 2. *bergmanniana.*
,, without purplish transverse streaks 1. *forkskaleana.*
3. Forewings with leaden-metallic markings . 4.
,, without leaden-metallic markings . 5.
4. Forewings suffused with orange or ferruginous 5. *conwayana.*
,, not orange or ferruginous . 3. *bifasciana.*
5. Forewings with large ferruginous dorsal patch 4. *ministrana.*
,, without ferruginous dorsal patch . 6.
6. Forewings green . . . . 7. *viridana.*
,, not green . . . . 7.
7. Forewings with 7 to markedly below apex . 8.

	Forewings with 7 to apex or very close beneath	16.
8.	Ground-colour of forewings white or whitish	9.
	,, ,, not whitish	10.
9.	Hindwings white	15. *cinctana.*
	,, grey	14. *politana.*
10.	Forewings suboblong, hindwings whitish-grey	13. *dumetana.*
	,, narrowed anteriorly, hindwings grey	11.
11.	Forewings with conspicuous dark central costal spot	11. *forsterana.*
	,, without such spot	12.
12.	Edge of basal patch more or less marked	13.
	,, ,, ,, not marked	14.
13.	Forewings whitish-ochreous or ochreous	6. *loeflingiana.*
	,, fuscous	12. *diversana.*
14.	Expanse 16 mm. or less	10. *rusticana.*
	,, 18 mm. or more	15.
15.	Head and thorax pale ferruginous	8. *paleana.*
	,, ,, brown	9. *viburniana.*
16.	Termen of forewings sinuate	17.
	,, ,, not sinuate	18.
17.	Forewings white	28. *argentana.*
	,, ochreous	29. *osseana.*
18.	Hindwings whitish	19.
	,, not whitish	20.
19.	Forewings white	23. *bellana.*
	,, grey	24. *colquhounana.*
20.	Hindwings dark fuscous	20. *nubilana.*
	,, not dark fuscous	21.
21.	Costa much arched anteriorly, then straight	16. *sinuana.*
	,, evenly arched	22.
22.	Forewings whitish-ochreous or greyish-ochreous	27. *longana.*
	,, not ochreous	23.
23.	Ground-colour of forewings mixed with white	24.
	,, ,, not mixed with white	28.
24.	Forewings more elongate, costa slightly arched	25.
	,, less elongate, costa moderately arched	26.
25.	Ground-colour of forewings white	25. *octomaculana.*
	,, ,, grey	26. *conspersana.*
26.	Costal patch connected with termen by an irregular streak	18. *virgaureana.*
	,, ,, not connected with termen	27.

27. Expanse 18 mm. or more; 6 and 7 of hindwings
usually separate . 17. *chrysanthemana.*
„ 16 mm. or less; 6 and 7 of hindwings
stalked . . . 19. *incertana.*
28. Costa gently arched, forewings uniform fuscous
21. *abrasana.*
„ moderately arched, forewings irrorated with
whitish-ochreous, often fasciated 22. *pascuana.*

1. **T. forskaleana**, *L.* 11-14 mm. Forewings suboblong, 7 to apex; pale yellowish, sharply reticulated with ferruginous-orange, somewhat mixed with dark fuscous; a dark fuscous oblique stria from middle of costa, meeting a variable sometimes obsolete fuscous dorsal blotch, containing two small black scale-tufts; a dark fuscous terminal streak. Hindwings whitish-yellowish, more or less fuscous-tinged posteriorly.

England to York, common; C. and SE. Europe; 7, 8. Larva pale yellow; head and plate of 2 greenish-tinged: on maple; 6.

2. **T. bergmanniana**, *L.* 13-14 mm. Thorax crested. Forewings suboblong, 7 to termen; yellow, reticulated and partly suffused with ferruginous-orange, basal third clearer; costa and a subbasal stria ferruginous-brown; two transverse streaks before and beyond middle, and a terminal streak pale shining grey-purplish, ferruginous-edged; a small black scale-tuft on fold in middle. Hindwings grey.

Britain to Caledonian Canal, Ireland, very common; N. and C. Europe, N. America; 6, 7. Larva yellow or yellowish-green; head and plate of 2 black: on rose; 5.

3. **T. bifasciana**, *Hb.* (*audouinana*, Dup.) 12-13 mm. Forewings suboblong, rather elongate, dark fuscous; several thick leaden-metallic transverse streaks; some small scale-tufts in disc; an irregular sometimes incomplete fascia in middle, and an apical spot yellow-ochreous. Hindwings rather dark grey.

SE. England to Dorset and Essex, local; WC. Europe; 6.

4. **T. ministrana**, *L.* 17-22 mm. Head dark fuscous. Thorax ferruginous-ochreous, with large crest. Forewings narrowed anteriorly, pale ochreous; base of costa, a more or less developed very large triangular often pale-centred dorsal suffusion, and terminal streak deep ferruginous; cilia dark ferruginous-fuscous Hindwings grey, termen darker.

Britain to Sutherland, N. Ireland, very common; N. and C. Europe, N. Asia, N. America; 5, 6. Larva light green; head brown: on hazel and birch; 8, 9.

5. **T. conwayana**, *F.* 11-15 mm. Thorax crested. Fore-

wings triangular, yellow, more or less suffused with orange or ferruginous, faintly darker-strigulated; basal patch often darker, always followed by a pale yellow dorsal mark; central and terminal fasciae often darker or blackish-mixed, edged with leaden-metallic dots. Hindwings blackish-grey, lighter anteriorly.

Britain to the Clyde, Aberdeen (?), Ireland, very common; C. Europe; 6. Larva yellow-whitish; dorsal line darker; head yellow-brownish: on seeds of ash and *Ligustrum*; 7-9.

6. **T. loeflingiana,** *L.* 14-18 mm. Forewings narrowed anteriorly, whitish-ochreous or pale ochreous, more or less darker-strigulated, sometimes partially suffused with brown; antemedian and central fasciae outlined with fuscous or dark fuscous towards costa and sometimes throughout, sometimes partly or wholly brown; cilia whitish-ochreous, base dark fuscous. Hindwings grey.

Britain to the Orkneys, Ireland, common, sometimes abundant; C. and S. Europe; 7. Larva pale green; spots, head, and plate of 2 black: on oak, hornbeam, etc.; 5.

7. **T. viridana,** *L.* 16-24 mm. Forewings suboblong, green or whitish-green; costal edge yellow-whitish. Hindwings light grey.

Britain to the Clyde, Ireland, very abundant; C. and S. Europe; 6, 7. Larva pale green; dots black; head black or brown; plate of 2 green, dotted with black or brown posteriorly, anterior edge pale: on oak (rarely beech, maple, etc.); 5. This larva sometimes abounds so as to completely strip the oaks of their leaves.

8. **T. paleana,** *Hb.* (*icterana,* Fröl.) 20-24 mm. Head and thorax pale ferruginous. Forewings narrowed anteriorly, whitish-ochreous or pale yellow-ochreous, sometimes greyish-tinged, base yellower. Hindwings grey.

Britain to the Hebrides, N. and E. Ireland, local; C. Europe; 7, 8. Larva blackish; spots large, white; head and plate of 2 black, anterior edge of plate white: on *Centaurea*, *Plantago*, etc.; 6.

9. **T. viburniana,** *F.* (*donelana,* Carpenter) 18-22 mm. Head and thorax brown. Forewings narrowed anteriorly, ochreous-brownish, sometimes faintly strigulated with ferruginous; central fascia and costal patch sometimes obscurely darker. Hindwings grey.

Britain to Caledonian Canal, Ireland, local; N. and C. Europe; 7. Larva pale olive-green or green-blackish; spots white; head and plate of 2 pale brown, black-marked: on *Vaccinium*, *Erica*, etc.; 5, 6.

10. **T. rusticana**, *Tr.* 12-16 mm. Head and thorax fuscous, somewhat mixed with pale ochreous. Forewings narrowed anteriorly, in ♂ light ochreous-brownish, in ♀ ochreous-yellowish, faintly strigulated with pale ferruginous. Hindwings grey.

Britain to the Shetlands, Ireland, local; N. and C. Europe, Asia Minor; 5, 6. Larva greenish-ochreous; dorsal and lateral lines darker; dots darker; head brown: on *Myrica*, *Vaccinium*, etc.; 7, 8.

11. **T. forsterana**, *F.* (*adjunctana*, Tr.) 22-26 mm. Forewings narrowed anteriorly, pale brownish, darker-strigulated; central fascia represented by a dark fuscous costal spot, and ill-defined praetornal suffusion; costal patch dark fuscous. Hindwings grey.

Britain to Ross, N. and E. Ireland, common; N. and C. Europe; 7. Larva pale grey-green or grey, sides sometimes whitish; head black; plate of 2 yellow-brown, with two black spots: on ivy, *Ligustrum*, etc.; 9-5.

12. **T. diversana**, *Hb.* (*transitana*, Gn.) 16-22 mm. Forewings somewhat narrowed anteriorly, fuscous, sometimes darker-strigulated; basal patch more or less darker-marked; central fascia and costal patch darker. Hindwings grey.

Kent to Hants, Hereford, York, local; C. Europe; 7. Larva green; head black or brown: on elm, birch, *Salix*, etc.; 9-5.

13. **T. dumetana**, *Tr.* 18-19 mm. Forewings broad, suboblong, brown, strigulated with dark fuscous; basal patch, central fascia, and costal patch darker, edged with dark ferruginous-fuscous; a dark stria from costal patch. Hindwings whitish-grey, apex more whitish and strigulated with grey.

Sussex, Cambridge, Hunts, local; C. Europe; 7, 8. Larva green, with paler and darker stripes: on *Lysimachia*, *Centaurea*, *Mentha*, etc.; 5, 6.

14. **T. politana**, *Hw.* (*lepidana*, HS.) 12-15 mm. Head and thorax dark ferruginous-fuscous; thorax crested. Forewings narrowed anteriorly, shining whitish, striated with light grey, margins marked with dark grey; basal patch, central fascia, costal patch, and a spot often connecting this with tornus red-brown, blackish-mixed; edge of basal patch angulated. Hindwings grey.

Britain to Caledonian Canal, E. and W. Ireland, local, on heaths; N. and C. Europe, N. America; 6, 7. Larva green: on *Myrica*, *Erica*, *Centaurea*, etc.; 9.

15. **T. cinctana**, *Schiff.* 15-17 mm. Head and thorax dark ferruginous-fuscous; thorax crested. Forewings narrowed anteriorly, clear white, posteriorly and on margins strigulated with leaden-grey; basal patch, central fascia, and costal spot ferruginous, mixed with leaden-grey and black; edge of basal patch straight. Hindwings white, thinly strigulated with grey.

Kent (Dover), local; C. Europe; 7.

16. **T. sinuana**, *Stph.* 17-21 mm. Antennal cilia of ♂ very short. Thorax crested. Forewings with costa much arched anteriorly, thence nearly straight, 7 to apex; grey, whitish-mixed; a curved fascia at ⅓, pointed beneath and not reaching dorsum, central fascia with anterior edge excavated in middle and above dorsum, and costal patch grey, in disc distinctly ochreous, partly edged with blackish. Hindwings light grey, terminally darker; 6 and 7 short-stalked.

England to Lancashire, Perth, local and uncommon; not recognised elsewhere; 7. Larva on flowers of *Scilla nutans*; 5.

17. **T. chrysanthemana**, *Dup.* (*alternella*, Wilk.) 18-21 mm. Antennal cilia of ♂ short. Thorax crested. Forewings elongate, costa moderately arched, 7 to or close beneath apex; grey, finely irrorated with whitish-ochreous and mixed with white; an angulated fascia at ⅓ not reaching dorsum, central fascia with anterior edge excavated in middle and above dorsum, ill-defined costal and terminal patches fuscous, edges partially blackish-marked. Hindwings light grey, in ♀ darker posteriorly; 6 and 7 approximated or seldom short-stalked.

England, Perth, E. Ireland, rather local; C. and S. Europe, WC. Asia to N. Persia; 7. Larva on *Chrysanthemum*, *Inula*, etc.; 5, 6.

18. **T. virgaureana**, *Tr.* 15-17 mm. Antennal cilia of ♂ short. Thorax crested. Forewings elongate, costa moderately arched, 7 to or close beneath apex; fuscous, sometimes mixed with white, finely irrorated with whitish-ochreous and strigulated throughout with dark fuscous; an angulated fascia at ⅓, indistinct dorsally, irregular central fascia, and costal patch connected by an irregular streak with termen darker fuscous. Hindwings fuscous, darker posteriorly; 6 and 7 short-stalked.

Britain to the Clyde, N. and E. Ireland, common, often abundant; C. Europe, N. Asia; 6, 7. Larva green-grey or blackish; spots sometimes black; head light brown; plate of 2 black, sometimes partly brown: on *Plantago*, *Lathyrus*, *Teucrium*, etc.; 5, 6.

19. **T. incertana,** *Tr.* (*subjectana,* Gn.) 15-16 mm. Antennal cilia of ♂ longer than in *T. virgaureana.* Thorax crested. Forewings slightly narrower than in *T. virgaureana,* costa less arched, 7 to or close beneath apex; fuscous, finely and densely irrorated with white; an angulated fascia at $\frac{1}{3}$ not reaching dorsum, central fascia with anterior edge excavated in middle and above dorsum, costal patch, and short terminal streak fuscous, irrorated with whitish-ochreous and dotted with dark fuscous. Hindwings pale grey, terminally darker, 6 and 7 short-stalked.

Britain to the Clyde, Moray, Ireland, very abundant; C. Europe; 6, 7. Larva blackish-brown or blackish; head brown; plate of 2 black: on *Lotus, Chrysanthemum, Ranunculus,* etc.; 5, 6.

20. **T. nubilana,** *Hb.* 12-14 mm. Antennae in ♂ not ciliated. Forewings relatively shorter than in *T. virgaureana,* costa rather strongly arched; 7 to or close beneath apex; dark fuscous, whitish-sprinkled, darker-strigulated; central fascia and an apical patch darker, usually indistinct. Hindwings dark fuscous, 6 and 7 approximated or short-stalked.

England to York, locally plentiful; C. and SE. Europe; 7. Larva pale green; head brown: on hawthorn and blackthorn; 5.

21. **T. abrasana,** *Dup.* 17-19 mm. Antennal cilia of ♂ very short. Thorax crested. Forewings elongate, costa gently arched, 7 to apex; fuscous, with a few scattered dark fuscous dots. Hindwings pale fuscous, 6 and 7 approximated at base.

Dorset to Oxford, Lancashire, Cumberland, local and scarce; SE. Europe; 7.

22. **T. pascuana,** *Hb.* (*pasivana,* Hb.) 16-18 mm. Antennal cilia of ♂ very short. Thorax crested. Forewings elongate, costa moderately arched, 7 to apex; fuscous, finely irrorated with whitish-ochreous; an angulated fascia at $\frac{1}{3}$, central fascia, and apical suffused patch darker, sometimes obsolete. Hindwings pale fuscous, darker terminally, 6 and 7 stalked.

England to York, E. Ireland, local; C. Europe, WC. Asia to N. Persia; 6, 7. Larva yellowish-grey; spots black: on flowers of *Chrysanthemum, Aster, Anthemis,* etc.; 5, 6.

23. **T. bellana,** *Curt.* (*penziana,* Wd., non Hb.) 22-27 mm. Antennal cilia in ♂ very short. Thorax crested. Forewings very elongate, costa hardly arched, 7 to apex; white, indistinctly strigulated with black; an angulated fascia at $\frac{1}{3}$ sometimes not reaching dorsum, irregular central fascia sometimes

interrupted near dorsum, small costal patch and irregular usually connected streak from termen fuscous much marked and suffused with black. Hindwings grey-whitish, greyer and faintly strigulated posteriorly, 6 and 7 short-stalked.

N. Wales to the Hebrides, E. Ireland, local, frequenting rocks; N. and C. Europe; 7. Larva on grass; 5, 6.

24. **T. colquhounana**, *Barr.* 22-27 mm. Differs from *T. bellana* as follows: forewings slightly broader anteriorly, ground-colour grey, whitish-mixed, markings much less defined.

I. of Man, E. Ireland, on coast rocks, local; not recognised elsewhere; 7. Larva on roots of *Silene maritima* (?); 5.

25. **T. octomaculana**, *Hw.* 18-22 mm. Antennal cilia of ♂ short. Thorax crested. Forewings elongate, costa slightly arched, 7 to or close beneath apex; white, more or less distinctly strigulated with grey; an angulated fascia at ⅓ usually not reaching dorsum, irregular central fascia usually interrupted near dorsum, costal and terminal patches fuscous marked with black strigulae. Hindwings grey, darker apically, 6 and 7 approximated or short-stalked.

Cheshire to Caledonian Canal, common; not recognised elsewhere; 7, 8. Larva blackish-grey; spots large, black; head pale brown; plate of 2 black: on *Centaurea*, *Plantago*, etc.; 6.

26. **T. conspersana**, *Dgl.* (*perterana*, Dbld.; ? *communana*, HS.) 16-22 mm. Antennal cilia of ♂ short. Thorax crested. Forewings elongate, costa slightly arched, 7 to apex; grey, irrorated or mixed with white, more strongly in ♀; an angulated fascia at ⅓, slender and often indistinct dorsally, irregular central fascia sometimes interrupted near dorsum, costal and terminal patches (seldom connected) grey or fuscous, often blackish-marked, sometimes nearly obsolete. Hindwings light fuscous or grey, in ♀ darker, 6 and 7 short-stalked.

England, local, especially on coast; Germany; 7. Larva pale greenish-grey; spots small, black; head and plate of 2 yellowish-brown: on flowers of *Chrysanthemum*, *Taraxacum*, *Teucrium*, etc.; 6.

27. **T. longana**, *Hw.* (*ictericana*, Hw.) 17-21 mm. Antennal cilia of ♂ short. Forewings elongate, costa hardly arched, 7 to or close beneath apex; in ♂ whitish-ochreous, unicolorous; in ♀ pale greyish-ochreous, an angulated fascia at ⅓, central fascia with anterior edge excavated in middle and above dorsum, and costal patch suffusedly connected with it beneath

costa brownish. Hindwings whitish-ochreous, more or less tinged or suffused with grey, 6 and 7 stalked.

England to York, S. Ireland, local; Holland, S. Europe, Canary Islands; 7. Larva pale yellowish; dorsal and subdorsal lines greenish-grey; spots black; head and plate of 2 pale brown: on flowers of *Hypochoeris*, *Anthemis*, *Aster*, etc.; 5, 6.

28. **T. argentana**, *Cl.* 20-25 mm. Forewings elongate, narrowed anteriorly, costa hardly arched, termen slightly sinuate; silvery white; costal edge ochreous-tinged. Hindwings grey-whitish.

Perth, local, on mountains; C. and SW. Europe, N. America; 7.

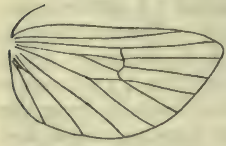
29. **T. osseana**, *Sc.* (*pratana*, Hb.) 19-23 mm. Forewings very elongate, costa almost straight, termen slightly sinuate; brownish-ochreous, sometimes ferruginous-tinged, seldom whitish-ochreous; an irregular spot in disc before and another beyond middle, and a triangular apical patch fuscous, often indistinct or sometimes obsolete. Hindwings grey.

Britain to the Shetlands, Ireland, locally plentiful, on downs, etc.; N. and C. Europe, N. America; 7, 8.

10. ISOTRIAS, *n.g.*

Antennae in ♂ shortly ciliated. Palpi moderately long, subascending. Thorax with small posterior crest. Forewings without costal fold; 7 to apex. Hindwings: 3 and 4 stalked, 5 parallel to 4, 6 and 7 remote at origin.

Includes only the single species.



Hindwing of *Isotrias hybridana.*

1. **I. hybridana**, *Hb.* ♂ 15-16 mm., ♀ 11-12 mm. Forewings white or whitish, strigulated with brown, on costa with dark fuscous; basal patch, somewhat angulated but hardly oblique central fascia, subapical fascia, and small tornal spot brown strigulated with black. Hindwings grey.

England to York, Argyll, E. Ireland, common; C. Europe; 5, 6.

11. EXAPATE, *Hb.*

Tongue absent. Antennae in ♂ moderately ciliated. Palpi short, porrected. Thorax with posterior crest. Forewings: 7 to termen or apex. Hindwings: 3 and 4 rather approximated at base, 5 somewhat approximated to 4, 6 and 7 stalked. Forewings of ♀ much reduced, hindwings obsolete.

Also restricted to one or perhaps two species.

1. **E. congelatella**, *Cl.* (*gelatella*, L.) ♂ 19-21 mm. Forewings slaty-fuscous, darker at base, along costa, and towards termen; a more or less distinct longitudinal streak of whitish irroration in disc; a dark fuscous spot in disc at ⅓, and another at ⅔; an indistinct darker spot above dorsum before tornus, and another on costa towards apex. Hindwings light fuscous.

♀ 8-9 mm. Forewings whitish-grey, margins more or less spotted or suffused with fuscous.

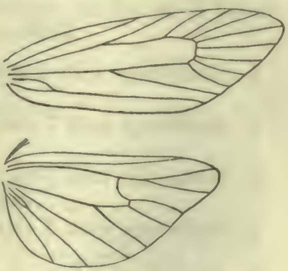
England to York, local; N. and C. Europe; 11, 12. Larva dull green; subdorsal line paler; dots dark or pale; head yellow-brownish, sometimes black-marked; plate of 2 brown or black: on *Rhamnus* and *Ligustrum*; 5.

12. CHEIMATOPHILA, *Stph.*

Tongue rudimentary. Antennae in ♂ moderately fasciculate-ciliated. Palpi moderate, porrected. Thorax with posterior crest. Forewings: 7 to termen or apex. Hindwings: 4 absent (coincident with 3), 5 rather approximated to 3, 6 and 7 stalked.

Only contains the one species.

1. **C. tortricella**, *Hb.* (*hyemana*, Hb.) 19-21 mm. Forewings light brownish-ochreous, brown, or grey, sometimes posteriorly with dark fuscous veins and strigulae; basal patch, posteriorly very ill-defined central fascia, and indications of costal patch ochreous-brown, sometimes marked with dark fuscous, often indistinct or almost wholly obsolete. Hindwings in ♂ light fuscous, darker terminally, in ♀ fuscous-grey.



Neuration of *Cheimatophila tortricella.*

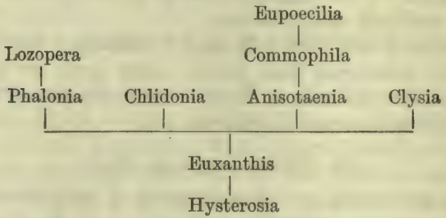
Britain to Perth, very common; C. and S. Europe: 3. Larva dull reddish-brown; dorsal and subdorsal lines whitish; tubercular spots black, whitish-ringed; head and plate of 2 yellowish-brown: on oak; 5, 6.

3. PHALONIADAE.

Antennae in ♂ ciliated. Forewings: 2 from posterior fourth of cell, 9 separate. Hindwings: lower median vein not hairy towards base.

Fairly numerous in the European region, but represented by comparatively few species elsewhere. Some exotic genera are peculiarly narrow-winged, combining with this character greater length of palpi, and a strong tendency to the possession of scale-tufts in the disc of forewings. Forewings with central fascia parallel to termen, ocellus absent. The larvae appear to be almost always internal feeders, whereas in the two preceding families this habit is less frequent.

Phylogeny of Phaloniadae.



Tabulation of Genera.

1.	Hindwings with 3 and 4 remote at origin	2.
	„ „ „ connate or stalked	4.
2.	Forewings with 7 and 8 stalked	1. Lozopera
	„ „ „ separate	3.
3.	Forewings with 7 to termen	3. Chlidonia.
	„ „ to costa or apex	2. Phalonia.
4.	Forewings with 7 and 8 stalked	7. Clysia.
	„ „ „ separate	5.
5.	Forewings with 7 to apex	6.
	„ „ „ termen	7.
6.	Forewings in ♂ with costal fold	4. Eupoecilia.
	„ „ without costal fold	5. Commophila.
7.	Forewings in ♂ with costal fold	9. Hysterosia.
	„ „ without costal fold	8.
8.	Hindwings with 6 and 7 stalked	8. Euxanthis.
	„ „ „ approximated	6. Anisotaenia.

1. Lozopera, *Stph.*

Thorax with posterior crest. Forewings: 7 and 8 stalked, 7 to costa. Hindwings: 3 and 4 remote at origin, 6 and 7 stalked.

Restricted to a few closely allied European species. Larva feeding among seeds of *Umbelliferae*, afterwards hybernating and pupating in the stems.

First fascia not reaching above middle . 2. *dilucidana*.
,, entire or narrowly interrupted near costa 1. *francillana*.

1. **L. francillana**, *F.* 14-18 mm. Forewings pale yellow; costal edge ferruginous on anterior half; two slender somewhat irregular dark ferruginous fasciae parallel to termen, first before middle, often narrowly interrupted near costa, second subterminal. Hindwings pale grey.

England to Lancashire, E. Ireland, local; C. and SW. Europe, WC. Asia to N. Persia; 7, 8. Larva yellow-whitish; head black; plate of 2 brownish-tinged: among seeds of *Daucus carota*; 8, 9.

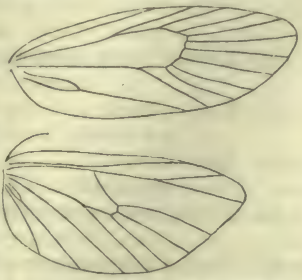
2. **L. dilucidana**, *Stph.* 13-15 mm. Differs from *L. francillana* as follows: forewings paler, first fascia extending from dorsum only to middle of wing.

England to York, E. Ireland, local; Germany; 7, 8. Larva yellow-whitish; head and two posterior marks on 2 black: among seeds of *Peucedanum sativum*; 8, 9.

2. Phalonia, *Hb.*

Thorax sometimes with posterior crest. Forewings: 7 to costa or apex. Hindwings: 3 and 4 separate at origin, 6 and 7 stalked.

A characteristically European genus of some extent, ranging also into the other northern temperate regions; a development of *Euxanthis*. The species are in some instances very closely allied together, and require careful consideration. Most of them are local, and more or less retired in habits in the perfect state. Larva stout, usually feeding within stems or seed-heads.



Neuration of *Phalonia tesserana.*

1. Forewings with four darker fasciae . . 2.
,, not with four fasciae . . . 3.
2. Forewings deep yellow . . . 1. *rutilana*.
,, silvery-white . . . 2. *dipoltella*.
3. Forewings with distinct subterminal parallel fascia 4.
,, without such fascia . . . 6.

4. Fasciae ferruginous . . 5. *smeathmanniana*.
,, not ferruginous . . . 5.
5. Cilia of forewings fuscous-spotted 4. *maritimana*.
,, ,, not fuscous-spotted . 3. *zephyrana*.
6. Forewings with black-mixed terminal fascia . 7.
,, without such fascia . . . 10.
7. Head yellow-ochreous . . 30. *curvistrigana*.
,, not yellow-ochreous . . . 8.
8. Head white . . . . . 9.
,, blackish or greyish-ochreous 26. *atricapitana*.
9. Thorax dark grey . . . 28. *dubitana*.
,, ochreous-white . . . 29. *hybridella*.
10. Median fascia almost straight . . . 11.
,, ,, more or less bent . . . 19.
11. Cilia of forewings yellowish . . . 12.
,, ,, not yellowish . . . 16.
12. Cilia of forewings with dark subapical line 20. *roseana*.
,, ,, without such line . . 13.
13. Forewings rosy-tinged . . . . 14.
,, without rosy tinge . . 22. *ciliella*.
14. Cilia of forewings with blackish basal line 19. *implicitana*.
,, ,, without such line . . 15.
15. Ground-colour of forewings grey-whitish 21. *degreyana*.
,, ,, ,, ochreous-whitish
23. *flaviciliana*.
16. Median fascia interrupted beneath costa . . 17.
,, ,, entire . . . . 18.
17. Head white . . . . 27. *pallidana*.
,, not white . . . . 9. *affinitana*.
18. Head white . . . . 25. *nana*.
,, not white . . . . 18. *subroseana*.
19. Ground-colour of forewings ferruginous 8. *tesserana*.
,, ,, ,, not ferruginous . 20.
20. Median fascia interrupted . . . 21.
,, ,, entire . . . . 23.
21. Fascia interrupted below middle . . . 22.
,, ,, above middle . . 10. *vectisana*.
22. Fascia dark brown, dorsally abruptly dilated 6. *badiana*.
,, ferruginous-brown, dorsally hardly dilated
7. *cnicana*.
23. Cilia of forewings ferruginous-yellowish 24. *erigerana*.
,, ,, not ferruginous-yellowish . 24.
24. Head white above . . . . 25.

Head not white above . . . . 26.
25. Ground-colour of forewings whitish-ochreous 11. *manniana.*
„ „ „ whitish . 12. *notulana.*
26. Ground-colour of forewings leaden-grey . 16. *griseana.*
„ „ „ not grey . . 27.
27. Hindwings grey . . . . . 28.
„ dark grey . . . 17. *rupicola.*
28. Subapical fascia distinctly reaching termen 14. *geyeriana.*
„ „ not reaching termen . . 29.
29. Central fascia marked posteriorly in middle with dark fuscous . 15. *mussehliana.*
„ „ not so marked . . 13. *udana.*

1. **P. rutilana**, *Hb.* 11-15 mm. Forewings elongate, costa slightly arched; deep yellow; four moderately broad shining violet-ferruginous fasciae, first basal, third dilated towards extremities, sometimes including a small yellow spot on dorsum, fourth terminal. Hindwings grey.

Surrey, Hants, local; N. and C. Europe, N. America; 7 8. Larva yellow; head light brown; plate of 2 paler: on *Juniperus*; 6.

2. **P. dipoltella**, *Hb.* 12-16 mm. Forewings elongate, costa hardly arched; silvery-white; base, four variable slender fasciae, and a costal spot before fourth deep ochreous, first fascia somewhat angulated, second sometimes costally furcate, third sometimes dorsally furcate, fourth nearly terminal. Hindwings light grey.

Kent to Hants, local; C. Europe, Asia Minor; 7, 8. Larva in flower-heads of *Achillea millefolium*; 9.

3. **P. zephyrana**, *Tr.* (*dubrisana*, Curt.) 10-16 mm. Forewings with costa gently arched; pale ochreous-yellowish, more or less sprinkled with blackish, costa strigulated with blackish; several transverse series of silvery-metallic spots; two narrow often very obscure more blackish fasciae parallel to termen, first median, usually interrupted near costa, second subterminal, somewhat interrupted above middle; cilia yellow-whitish. Hindwings in ♂ grey-whitish, in ♀ grey.

S. England to Worcester and Cambridge, Cumberland, rather local; C. and S. Europe, WC. Asia to N. Persia; 6. Larva yellow; head pale brownish; plate of 2 pale yellow: in stems of *Daucus carota*; 8-4.

4. **P. maritimana**, *Gn.* 15-19 mm. Differs from *P. zephyrana* as follows: forewings somewhat broader, yellower, first fascia

angulated in disc, cilia spotted with fuscous; hindwings grey, towards base white strigulated with grey.

Kent, Essex, local; France; 7. Larva in stems and roots of *Eryngium maritimum;* 9-4.

5. **P. smeathmanniana,** *F.* 14-18 mm. Forewings elongate, costa slightly arched; light ochreous-yellow, with several obscure pale submetallic striae; slender antemedian and subterminal ferruginous fasciae, somewhat mixed with dark fuscous, parallel to termen, widely interrupted beneath costa. Hindwings pale grey, darker in ♀.

Britain to Perth, local; N. and C. Europe, Asia Minor, N. America; 6, 7. Larva brown-grey; head blackish-brown: in flower-heads of *Anthemis*, *Achillea*, and *Centaurea;* 9, 10.

6. **P. badiana,** *Hb.* 16-20 mm. Forewings with costa moderately arched; pale ochreous, with several obscure shining whitish striae; a dark brown spot along base of costa; a narrow dark brown antemedian fascia, angulated above middle, interrupted below angle, abruptly dilated on dorsum; subterminal fascia represented by dark brown spots on costa and dorsum, and a very indistinct spot between them. Hindwings rather dark grey.

Britain to the Clyde, E. Ireland, rather common; C. Europe; 7. Larva in stems and roots of *Arctium lappa;* 9-4.

7. **P. cnicana,** *Dbld.* 14-16 mm. Differs from *P. badiana* as follows: forewings with markings bright ferruginous-brown, antemedian fascia less angulated, less distinctly interrupted, not dilated on dorsum.

Britain to the Shetlands, E. Ireland, common; C. Europe; 6, 7. Larva in stems and roots of *Carduus;* 9-4.

8. **P. tesserana,** *Tr.* 10-15 mm. Forewings with costa slightly arched; bright ferruginous; two quadrate ochreous-yellowish spots on costa before and beyond middle; sometimes two larger similar spots on dorsum alternating with these; sometimes several leaden-metallic striae edging the spots. Hindwings grey.

Britain to Argyll, common; C. and S. Europe, WC. Asia to N. Persia; 6, 7. Larva in roots of *Picris* (and probably *Hieracium*); 9-4.

9. **P. affinitana,** *Dgl.* (*cancellana*, Z.) 12-15 mm. Forewings elongate, costa gently arched; light brownish-ochreous, submetallic, strigulated with fuscous; a slender straight brownish antemedian fascia parallel to termen, interrupted

beneath costa; a dark fuscous dorsal dot or small spot before tornus. Hindwings grey.

England to Lancashire, local; Germany, France, Sicily; 7. Larva whitish, dorsally greyish-tinged; spiracular line faint, grey; head brown; plate of 2 black: in flower-heads of *Aster tripolium;* 8-10.

10. **P. vectisana**, *Westw.* 9-11 mm. Forewings elongate, costa gently arched; brownish-ochreous, sprinkled with dark fuscous, towards termen and on dorsum strigulated with dark fuscous; a narrow obscure rather dark fuscous median fascia, somewhat angulated and interrupted near costa, connected in middle with tornus by an oblique dark suffusion; a fuscous spot on costa towards apex. Hindwings rather dark grey.

England to Lancashire, on coasts, local; Holland, Germany; 5, 7, 8. Larva in flower-heads of *Plantago maritima;* 6, 9.

11. **P. manniana**, *F.R.* (*luridana*, Gregs.) 11-13 mm. Head white, sides ochreous-brown. Forewings with costa moderately arched; whitish-ochreous, margins strigulated with brown; a suffusion along base of costa, an oblique streak from dorsum near base, a median fascia angulated above middle, a fascia-like spot from costa posteriorly not reaching termen, and indistinct suffusions before and above tornus deep ochreous, sometimes brown-sprinkled. Hindwings pale grey.

Surrey to Dorset, Wilts, Norfolk, Westmoreland, on dry grassy banks, local; C. and SE. Europe, WC. Asia to Turkestan; 6, 7.

12. **P. notulana**, *Z.* 10-11 mm. Head white, sides ochreous. Forewings with costa moderately arched; whitish, more or less strigulated with dark fuscous; base suffused with fuscous; an irregular median fascia angulated above middle, a suffusion above tornus, and a narrow fascia from costa posteriorly to termen above tornus dark fuscous. Hindwings grey.

England to Lancashire, rather common; C. Europe; 6, 7. Larva pale yellowish-green; head and plate of 2 black: in stems of *Mentha hirsuta* and *Lycopus;* 9, 10.

13. **P. udana**, *Gn.* (*griseana*, Wilk.) 11-13 mm. Head pale ochreous. Forewings with costa gently arched; pale ochreous, submetallic, margins more or less strigulated with dark fuscous; an ochreous-brownish basal patch, often represented by angulated edge only; a slightly curved ochreous-brown median fascia, suffused with blackish below middle; some ochreous-brownish clouds towards tornus; an ochreous-brown fascia from costa posteriorly, obsolete before termen. Hindwings grey.

S. England to Pembroke and Norfolk, local; France, Holland; 6-8. Larva dull yellowish-pink or pinkish-brown; head and plate of 2 black-brown: in stems of *Alisma;* 9, 10.

14. **P. geyeriana,** *HS.* 11-13 mm. Differs from *P. udana* as follows: forewings with median fascia distinctly angulated above middle, emitting a brown streak from angle to tornus, a triangular brown spot on dorsum before tornus, posterior fascia well-defined and continued to termen above tornus, sometimes connected with tornal streak.

Dorset, Suffolk, Norfolk, local; Germany; 5, 6, 8. Larva pale fuscous; head and plate of 2 blackish-fuscous: in seed-capsules of *Pedicularis palustris;* 7, 9.

15. **P. mussehliana,** *Tr.* 10-13 mm. Differs from *P. udana* as follows: forewings with markings broader, more indistinct and suffused, median fascia marked with dark fuscous on posterior edge in middle.

Devon, scarce and local, not taken for many years; C. Europe; 5, 6, 8. Larva in seed-vessels of *Butomus;* 7, 9.

16. **P. griseana,** *Stph.* 9-10 mm. Forewings with costa gently arched; shining leaden-grey, strigulated with dark fuscous, irregularly tinged with ferruginous-ochreous suffusion; an angulated median fascia and small anteapical costal spot dark ochreous-fuscous. Hindwings dark grey.

Locality unknown (eight specimens in Stephens's collection, British Museum); not recognised elsewhere. Probably a marsh-frequenting species.

17. **P. rupicola,** *Curt.* 12-14 mm. Forewings with costa moderately arched; pale yellow-ochreous or ochreous-grey-whitish, more or less blackish-sprinkled, costa strigulated with blackish; a suffusion along base of costa, a moderately broad rather ill-defined median fascia somewhat angulated near costa, and a broad posterior suffusion ferruginous-ochreous or dark grey, more or less blackish-sprinkled. Hindwings dark grey.

England, rather local; C. Europe, Sardinia; 6, 7. Larva yellowish-pink: in stems of *Eupatorium;* 9-4.

18. **P. subroseana,** *Hw.* 11-13 mm. Forewings with costa gently arched; whitish-ochreous, costa suffused with deeper ochreous towards base; a straight ferruginous-ochreous median fascia, anteriorly blackish-edged towards dorsum; beyond this a general brownish-rosy suffusion except on dorsum beyond fascia, including an obscure ferruginous-ochreous posterior fascia, marked with blackish on costa; a blackish dot on dorsum before tornus. Hindwings grey.

Kent, Surrey, local; Germany; 6, 7. Larva in seed-heads of *Solidago;* 9, 10.

19. **P. implicitana,** *Wk.* (*anthemidana,* Wilk.; *heydeniana,* Wlsm., non HS.) 10-13 mm. Forewings with costa slightly arched; whitish-ochreous, rosy-tinged, indistinctly strigulated with fuscous; costa somewhat suffused basally with ochreous-brownish; a nearly straight ferruginous-ochreous median fascia, costal end faint and brownish; a ferruginous-ochreous suffusion towards tornus; cilia ochreous-yellowish, basal line blackish. Hindwings pale grey.

Kent, Sussex, Surrey, local; Germany; 5, 7, 9. Larva pale yellow; head light brown; plate of 2 yellowish, with two black posterior dots: in seedheads and stems of *Matricaria, Anthemis, Solidago,* etc.; 6, 8, 10.

20. **P. roseana,** *Hw.* 10-14 mm. Forewings with costa nearly straight; light yellow-ochreous, towards costa and posteriorly suffused with rose-pink; a ferruginous-ochreous median fascia, becoming obsolete towards costa, dorsally sprinkled with dark fuscous; cilia yellow-ochreous, with a dark fuscous subapical line. Hindwings light grey.

England to Lancashire, common; C. Europe; 6-8. Larva pale green; head and plate of 2 black: in seedheads of *Dipsacus sylvestris;* 8-5.

21. **P. degreyana,** *McL.* 11-13 mm. Head white. Forewings narrower than in *P. ciliella,* with costa nearly straight; silvery-grey-whitish, posteriorly suffusedly irrorated with rose-pink, on base of costa and along termen with ferruginous; a straight ferruginous median fascia mixed with dark fuscous, costal end faint and greyish; cilia ferruginous-yellowish. Hindwings pale grey.

Norfolk, local; not recorded elsewhere; 5, 7. Larva pale yellow; head brown; plate of 2 pale yellow, with two black posterior dots: in flowers and seeds of *Plantago* and *Linaria;* 6, 8, 9.

22. **P. ciliella,** *Hb.* (*ruficiliana,* Hw.; *subroseana,* Wilk.) 11-14 mm. Head whitish. Forewings with costa nearly straight; whitish-grey or ochreous-whitish, more or less sprinkled or strigulated with ferruginous-ochreous, especially towards base of costa and posteriorly; a straight ferruginous median fascia more or less mixed with dark grey, obsolete on costa; often a grey suffusion along termen; cilia ferruginous-yellow. Hindwings light grey.

Britain to the Shetlands, N. Ireland, common; N. and C.

Europe; 5, 6. Larva whitish; head and plate of 2 black: in seed-vessels of cowslip (*Primula veris*); 7, 8.

23. **P. flaviciliana**, *Wilk.* 12-14 mm. Differs from *P. roseana* as follows: forewings with ground-colour ochreous-whitish, cilia ferruginous-yellow, without dark fuscous line.

Kent and I. of Wight to Oxford, local; not recorded elsewhere; 7. Larva varying from dull green to reddish-brown; head and plate of 2 brown: in flower-heads of *Knautia;* 8-10.

24. **P. erigerana**, *Wlsm.* 10-12 mm. Forewings with costa slightly arched; ochreous-whitish, with fuscous striae and strigulae suffused with ochreous; an ochreous-brown median fascia angulated near costa, partly blackish-edged, indistinctly interrupted below angle, above interruption becoming grey; a more or less distinct suffused dark grey posterior striga; a blackish dorsal dot before tornus; cilia ferruginous-yellowish, basal line and some bars of irroration blackish. Hindwings light grey.

Kent and Sussex to Norfolk, local; not recorded elsewhere; 6, 8. Larva white; head brownish: in flowers of *Erigeron acre;* 6, 7, 9.

25. **P. nana**, *Hw.* 9-12 mm. Head white. Forewings with costa gently arched; white, basal area and costa strigulated with blackish; a broad direct median fascia of blackish irroration and strigulae, dilated dorsally, posterior edge sinuate; apical area clouded with pale ochreous, with a suffused spot of blackish irroration on costa before apex, sometimes indistinctly connected with tornus; cilia pale ochreous, with indistinct bars of blackish irroration. Hindwings pale grey.

Britain to the Clyde, E. Ireland, common; C. Europe, WC. Asia to N. Persia, N. America; 6. Larva in catkins of birch; 3, 4. The imago is found resting on the trunks.

26. **P. atricapitana**, *Stph.* 12-15 mm. Head in ♂ blackish, in ♀ greyish-ochreous. Forewings with costa gently arched; rosy-ochreous-whitish, costa and dorsum strigulated with blackish; a small dark ashy-fuscous basal patch; a spot on costa touching it, a very irregular median fascia, a narrow terminal fascia dilated or furcate on costa, and cilia brown much marked with black; a pale greyish-ochreous cloud above tornus. Hindwings in ♂ whitish-grey strigulated with grey, in ♀ grey.

England, Roxburgh, E. Ireland, local; Holland, Germany; 5, 6, 8. Larva pale yellow, faintly reddish-tinged above; head light brown; plate of 2 faintly brownish: in stems of *Senecio jacobaea*; 7, 9-4.

27. **P. pallidana**, *Z.* (*albicapitana*, Cooke) 11-13 mm. Head white. Thorax dark fuscous mixed with whitish. Forewings with costa slightly arched; ochreous-whitish, with faint greyish-ochreous strigulae, costa strigulated with blackish; base and costa towards base suffusedly dark fuscous; a dark fuscous blackish-marked median fascia, narrowed on costa, broadly interrupted with pale ochreous above middle; a dark grey posterior transverse streak, sometimes extending to termen. Hindwings grey.

Britain to the Clyde, E. Ireland, local; C. Europe; 6. Larva rose-pink, greenish-tinged; head and plate of 2 brown or black-brown: in seedheads of *Jasione montana*; 7, 8.

28. **P. dubitana**, *Hb.* 12-14 mm. Head white. Thorax dark grey. Forewings with costa gently arched; ochreous-whitish or rosy-whitish, costa strigulated with blackish; a small basal patch and spot on costa touching it dark grey; an irregular brownish median fascia, dark grey on costa and dorsum, obliquely interrupted above middle; a pale greyish-ochreous cloud above tornus; a narrow terminal fascia, dilated on costa, and cilia dark grey, blackish-mixed. Hindwings in ♂ whitish-grey, in ♀ grey.

Britain to the Clyde, local; N., C., and SW. Europe, N. America; 6, 8. Larva whitish; head light red-brown; plate of 2 yellow, black-edged posteriorly: in seedheads of *Senecio*, *Crepis*, *Solidago*, etc.; 7, 9.

29. **P. hybridella**, *Hb.* (*carduana*, Z.) 11-14 mm. Head ochreous-white. Thorax ochreous-white, somewhat fuscous-marked. Forewings with costa hardly arched; ochreous-white, sometimes faintly rosy-tinged, costa and dorsum strigulated with blackish; a fuscous stria at $\frac{1}{4}$, forming a small costal spot; a very irregular median fascia, narrow on costa and widely interrupted beneath it, and irregular terminal fascia mixed with ferruginous, dark fuscous, and black. Hindwings in ♂ whitish-grey, in ♀ grey.

England to York, E. Ireland, local; C. and SE. Europe, Asia Minor; 7. Larva pale pink; head light brown; plate of 2 yellowish, with four black dots: in seedheads of *Picris hieracioides*; 8, 9.

30. **P. curvistrigana**, *Wilk.* 13-14 mm. Head yellow-ochreous. Forewings with costa more arched posteriorly; yellow-ochreous, with several ochreous-whitish submetallic

striae, costa strigulated with black; an irregular dark grey black-mixed antemedian fascia, much dilated on costa, anterior edge concave; some blackish strigulae in disc beyond this; a broad dark grey terminal fascia, mixed with black and ochreous, narrowed to a point beneath, anterior edge curved. Hindwings dark grey.

Kent to Devon and Hereford, local; Germany; 5, 6. Larva pale yellowish-pink; head light brown; plate of 2 ochreous: in seedheads of *Solidago;* 8, 9.

3. CHLIDONIA, *Hb.*

Thorax with posterior crest. Forewings: 7 to termen. Hindwings: 3 and 4 remote at origin, 6 and 7 stalked.

Contains only the two following species, which are so similar that they have often been regarded as doubtfully distinct; an offshoot of *Euxanthis.*

Fascia right-angled, dark fuscous . 1. *baumanniana.*
„ obtuse-angled, ferruginous . 2. *subbaumanniana.*

1. **C. baumanniana,** *Schiff.* 18-23 mm. Forewings pale ochreous, somewhat ferruginous-sprinkled; basal area suffused with dark fuscous, near costa white-edged and sharply marked; a narrow dark reddish-fuscous partly white-edged fascia before middle, right-angled and narrowly interrupted in disc; a dark fuscous posterior blotch on costa, edged with white spots; a dark reddish-fuscous band from middle of fascia to tornus, edged and interrupted with white spots; a reddish-fuscous suffusion below this, and some white and reddish-fuscous spots above it; a dark fuscous terminal streak. Hindwings light grey.

Britain to the Orkneys, Ireland, rather common; C. Europe; 5, 6. Larva in rootstock of *Scabiosa;* 8-3.

2. **C. subbaumanniana,** *Wilk.* 13-16 mm. Differs from *C. baumanniana* as follows: forewings with all dark markings ferruginous, fascia obtusely angulated and with lower portion less oblique inwardly, white markings more largely developed and forming nearly continuous striae instead of spots; hindwings usually rather darker.

Britain to Sutherland, rather common; Germany (?); 6, 7.

4. EUPOECILIA, *Stph.*

Thorax with posterior crest. Forewings in ♂ with small costal fold; 7 to apex. Hindwings: 3 and 4 connate, 6 and 7 closely approximated towards base.

Besides the following there is one other European species. The imago flies freely in woods amongst its foodplant.

1. **E. maculosana**, *Hw.* 11-14 mm. Forewings white, more or less strigulated with grey; basal area and broad cloudy direct antemedian fascia dark grey, spotted in disc with black and sometimes ferruginous; a curved stria from tornus not reaching costa, and a subapical fascia dark grey; apex and termen streaked with ferruginous. Hindwings in ♂ white, costa, termen, and some anteapical spots dark fuscous, in ♀ wholly dark grey.

England, Kirkcudbright, E. Ireland, common; Germany; 5, 6. Larva white; dorsal, spiracular, and subspiracular lines pale ferruginous; spots pale ferruginous; head pale brown; plate of 2 black: in seed-vessels of *Scilla nutans*; 7.

5. Commophila, *Hb.*

Thorax with posterior crest. Forewings with more or less developed scale-tufts on surface; 3 and 4 sometimes stalked, 7 to apex. Hindwings: 3 and 4 connate or stalked, 6 and 7 closely approximated towards base.

Includes a few European species only; all are local, and the perfect insects of very sluggish habit.

1. Head white . . . . . 2.
 ,, yellowish . . . 3. *schreibersiana.*
2. Tufts of forewings strong, numerous . 1. *rugosana.*
 ,, slight . . . 2. *amandana.*

1. **C. rugosana**, *Hb.* 16-20 mm. Head white. Forewings with tufts numerous and conspicuous; light brown, partly rosy-tinged, mixed and partly striated with white and black; some irregular black marks in disc; a triangular antemedian costal blotch much marked with black in disc, enclosing a white costal spot and edged by similar spots; some grey spots beneath this. Hindwings light fuscous, darker-strigulated.

England to York, local; C. and SW. Europe; 6. Larva pale green; head dark brown; plate of 2 green: in berries of *Bryonia*; 7, 8.

2. **C. amandana**, *HS.* (*sodaliana*, Wilk.) 13-15 mm. Head white. Forewings with tufts slight; white, with scattered dark fuscous scales, costa posteriorly spotted with dark fuscous; a black costal mark near base; a quadrate median dorsal blotch mixed with fuscous, dark fuscous, and grey, surmounted by some flesh-coloured marks and a black spot; a broad fuscous terminal fascia hardly reaching costa, in middle blotched with

black and mixed with silvery-white, with a ferruginous-red apical spot. Hindwings pale grey, darker-strigulated.

England, local; C. Europe; 6. Larva purplish, incisions light green; head yellow-brown; plate of 2 black: in berries of *Rhamnus catharticus;* 7, 8.

3. **C. schreibersiana**, *Fröl.* 12-15 mm. Head yellow-ochreous. Forewings with tufts slight; dark fuscous, black-mixed, with leaden-metallic striae; basal blotch with edge sharply angulated near costa, and a costal spot beyond middle bright yellow-ochreous, striated with silvery-whitish, and marked on costa with black. Hindwings dark fuscous.

Suffolk, Cambridge, Hunts, local; C. Europe, WC. Asia to N. Persia; 5, 6. Larva in bark of elm; 8, 9.

6. ANISOTAENIA, *Stph.*

Thorax with posterior crest. Forewings: 7 to termen. Hindwings: 3 and 4 connate, 6 and 7 closely approximated towards base.

The single species constituting this genus is a singular insect of undefined type and rather uncertain affinities, but may probably be regarded as an early form of this family.

1. **A. ulmana**, *Hb.* 12-16 mm. Forewings dark fuscous, more or less strigulated or mixed with blackish, with some obscure leaden-metallic spots; an irregular white rather oblique antemedian fascia, in ♂ slender, often interrupted or reduced to one or two variable spots, in ♀ rather broad, entire; sometimes two or three small white spots on costa posteriorly. Hindwings dark fuscous.

Britain to the Clyde, N. and W. Ireland, rather common; C. Europe; 6, 7. Larva in folded leaves of *Ranunculus ficaria;* 4.

7. CLYSIA, *Hb.*

Thorax smooth. Forewings: 7 and 8 stalked, 7 to termen. Hindwings: 3 and 4 stalked, 6 and 7 stalked.

Also contains only a single species, which has seldom been noticed in this country. The peculiar variability of the larval habit seems to call for further investigation.

1. **C. ambiguella**, *Hb.* 12-15 mm. Head whitish. Forewings whitish-ochreous, clouded and strigulated with darker ochreous; costal edge dark fuscous anteriorly; a broad dark grey antemedian fascia, mixed with blackish and in disc with ferruginous, much narrowed dorsally; dorsum dotted with blackish; some

blackish apical or subapical marks. Hindwings light grey, in ♂ whitish-suffused anteriorly.

Sussex to Dorset and Essex, local; C. Europe; 6. Larva pale brownish-yellow; head and plate of 2 black: in berries of *Rhamnus frangula;* 7, 8. The larva cuts out a case from a dead leaf to pupate in. On the Continent the larva feeds in the flower buds of the vine, and is very injurious; the variation in habit is very remarkable.

8. Euxanthis, *Hb.*

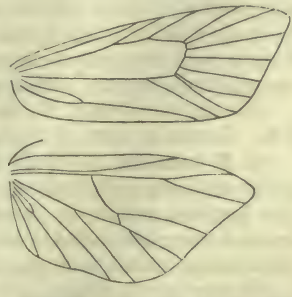
Thorax with posterior crest or smooth. Forewings: 7 to termen. Hindwings: 3 and 4 stalked, 6 and 7 stalked.

A rather small genus, ranging throughout northern temperate regions. The imagos occur more freely on the wing than in most other genera of the family.

1. Costa of forewings nearly straight . . . 2.
„ „ moderately arched . . 5.
2. Forewings orange . . . 4. *aeneana.*
„ pale ochreous . . . . 3.
3. Antemedian fascia entire . . . 1. *angustana.*
„ „ not reaching costa . . 4.
4. Forewings with distinct darker basal and subterminal suffusions . . 3. *alternana.*
„ without such suffusions . 2. *straminea.*
5. Termen ferruginous-fuscous . . 5. *zoegana.*
„ yellow . . . . 6. *hamana.*

1. **E. angustana,** *Tr.* 11-15 mm. Forewings with costa hardly arched; ochreous-whitish, strigulated and blotched with ochreous; costal edge dark fuscous anteriorly; a moderate slightly curved antemedian fascia and narrow terminal fascia leaden-grey mixed with deep ochreous and black. Hindwings whitish or light fuscous, strigulated with darker.

Britain to the Orkneys, Ireland, common; C. Europe; 6, 8. Larva pinkish; head and plate of 2 dark brown: in flower-heads of *Achillea, Plantago, Origanum,* etc.; 7, 9, 10.



Neuration of *Euxanthis angustana.*

2. **E. straminea,** *Hw.* 15-18 mm. Forewings with costa

almost straight, whitish-ochreous, clouded and strigulated with darker; a few dark fuscous scales on costa; an ochreous-brown streak from dorsum before middle parallel to termen, reaching rather more than half across wing; a fuscous dorsal dot before tornus; a brownish terminal line. Hindwings rather light grey.

Britain to Argyll, N. and E. Ireland, rather local; C. and S. Europe, WC. Asia to N. Persia; 5, 6, 8. Larva whitish-yellowish; head black; plate of 2 brown: in flower-heads of *Centaurea nigra;* 7, 9.

3. **E. alternana,** *Stph.* (*gigantana,* Gn.) 19-25 mm. Differs from *E. straminea* as follows: forewings with costa and dorsum distinctly spotted with fuscous, antemedian streak usually more or less mixed with dark fuscous, preceded and followed by paler suffusions, a curved transverse deeper ochreous subterminal suffusion; hindwings in ♂ more whitish-grey.

Kent, Essex, York, local; C. Europe; 7, 8. Larva pale yellow; spots small, black; head dark brown; plate of 2 black-brown: in flower-heads of *Centaurea scabiosa;* 6, 7.

4. **E. aeneana,** *Hb.* 12-16 mm. Forewings with costa hardly arched; deep orange; costa and dorsum partly strigulated with black; rather broad very irregular central and terminal fasciae black mixed with bright leaden-metallic. Hindwings dark fuscous.

Kent, Surrey, Middlesex, Essex, local; Germany; 6. Larva in roots of *Senecio jacobaea;* 9-4.

5. **E. zoegana,** *L.* 17-21 mm. Forewings with costa moderately arched; bright yellow or yellowish-ferruginous; costal edge, a small subdorsal spot before middle, and a large terminal blotch with angulated edge including a spot of ground-colour ferruginous-fuscous. Hindwings dark grey.

Britain to Stirling, N. Ireland, rather common; C. Europe; 6-8. Larva in roots of *Scabiosa columbaria;* 9-4.

6. **E. hamana,** *L.* 17-23 mm. Forewings with costa moderately arched; pale yellow; base of costa, and a streak from disc beyond middle to tornus ferruginous-fuscous; sometimes several irregular variable ferruginous marks towards margins. Hindwings rather dark grey.

Britain to the Clyde, Ireland, common; C. and SW. Europe, WC. Asia to N. Persia; 6-8. Larva probably in roots of *Carduus.*

9. HYSTEROSIA, *Stph.*

Thorax smooth. Forewings in ♂ with strong costal fold; 7 to termen. Hindwings: 3 and 4 connate, 6 and 7 closely approximated towards base.

Only the one species is known. There can be little doubt that it is an early unspecialised form, correctly indicating the line of ancestral connection with the typical *Tortricidae.*

1. **H. inopiana**, *Hw.* 19-22 mm. Forewings light ochreous, more or less sprinkled or strigulated with brownish, sometimes reddish-tinged; sometimes two darker dots in disc beyond middle. Hindwings pale fuscous.

England to York, W. Ireland, local; C. Europe, N. America; 7. Larva ochreous-whitish; head and plate of 2 brown: in roots of *Artemisia campestris;* 9-4.

4. TRYPANIDAE.

Ocelli absent. Forewings: 2 from posterior third of cell, 9 out of 7. Hindwings: lower median vein without defined basal pecten of hairs.

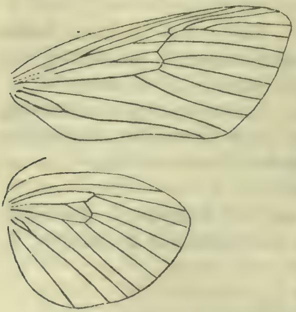
A family of inconsiderable extent; probably Indo-Malayan in origin, but generally distributed except in New Zealand. It represents an early unspecialised type of the *Tortricina,* though the larva exhibits very strongly the peculiar tendency of internal-feeding larvae of this group towards a pink colouring; the internal-feeding larvae of other groups being usually whitish. The large size of the single British species (not however always maintained in exotic forms) is doubtless due to the wood-feeding habit, which removes the ordinary restrictions of season and food-supply. Imago with type of markings as in the *Tortricidae,* but ill-defined.

1. TRYPANUS, *Ramb.*

Tongue obsolete. Antennae $\frac{1}{3}$-$\frac{2}{5}$, lamellate throughout, in ♂ more strongly. Labial palpi moderate, curved, ascending, with dense loosely appressed scales, terminal joint very short. Posterior tibiae rough-scaled. Forewings: forked parting-vein well-marked, 8 and 9 out of 7, 8 to below apex, 11 from before middle. Hindwings ovate, densely hairy beneath cell towards base, cilia short; forked parting-vein well-marked, 6 and 7 connate or approximated.

A small genus, yet occurring in all main regions, except New

Zealand. Imago with forewings elongate-triangular, dorsum rounded-prominent towards base, body stout and heavy. Larva stout, eating galleries in solid wood. Pupa subterranean.



Neuration of *Trypanus cossus.*

1. **T. cossus,** *L.* (*ligniperda,* F.) 70-94 mm. Collar edged with pale ochreous. Thorax with blackish posterior irregular bar. Forewings pale brown, mixed with whitish, with numerous irregular partly anastomosing more or less alternating brown and blackish striae; a stronger blackish line from $\frac{2}{3}$ of costa to near tornus, preceded towards costa by a fuscous band, and another from costa near apex. Hindwings pale fuscous reticulated with darker.

Britain to Ross, Ireland, rather common; Europe, WC. Asia to N. Persia, N. Africa; 6-8. Larva brown-red above, on sides yellowish-fleshcolour; head black; plate of 2 dark brown: in trunks of elm, ash, poplar, etc.; 7-6, usually living two or more years. This larva gives out a strong and unpleasant rank odour.

8. TINEINA.

Head with appressed scales or rough-haired (*Tineidae*). Antennae usually $\frac{3}{4}$ or more. Maxillary palpi often developed. Labial palpi with terminal joint more or less pointed. Tibiae with all spurs present, long. Forewings: 1b normally furcate, 1c more or less developed, 5 normally not more approximated to 4 than to 6, neuration sometimes much degraded. Hindwings with frenulum, 1c present (sometimes doubtful in forms with degraded neuration), 8 sometimes connected with middle of upper margin of cell, thence diverging, seldom absent (*Aegeriadae*), neuration sometimes much degraded.

Probably far more numerous than any of the other groups, though the small size of the species has led to their being often neglected. In certain families (especially the *Tineidae*) there is a remarkable tendency to degradation of the wing-structure, the wings becoming very narrow (compensation being afforded by a great increase in the length of the cilia), and many of the veins disappearing by coincidence. Notwithstanding the great difference of structure between extreme forms, the whole are so closely connected by intermediate gradations that the clear definition of families is by no means easy.

Imago with forewings more or less elongate, varying from oblong to linear; hindwings varying from ovate to linear.

Type of markings: forewings with three small dark spots or dots (*stigmata*), two being in disc before and beyond middle respectively (*first* and *second discal*), and one on fold before middle (*plical*); hindwings without markings.

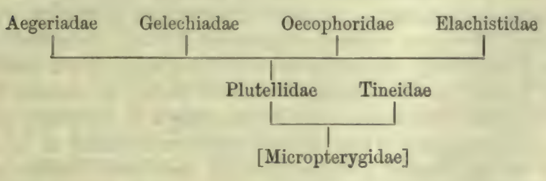
Ovum usually roundish or oval, smooth, but comparatively little known.

Larva more or less elongate, with few hairs, usually living concealed, but very various in habit.

Pupa with free segments variable; in earlier forms protruded from cocoon in emergence, not in higher forms.

In the diagram illustrating the phylogeny the *Micropterygidae* are introduced in brackets to explain the common ancestry; the *Plutellidae* and *Tineidae* must not however be conceived as originating independently from that family, but from an unknown common progenitor possessing hindwings of the normal Tineid type.

PHYLOGENY OF TINEINA.



TABULATION OF FAMILIES.

1.	Hindwings with 8 absent . .	1. AEGERIADAE.
	,, ,, 8 present	2.
2.	Head at least partly rough-haired	6. TINEIDAE (part).
	,, smooth or with loosely appressed hairs .	3.
3.	Antennae with basal eyecap .	6. TINEIDAE (part).
	,, without eyecap . . .	4.
4.	Maxillary palpi developed . . .	5.
	,, ,, rudimentary . . .	6.
5.	Forewings with 7 to termen	5. PLUTELLIDAE (part).
	,, ,, 7 to costa .	6. TINEIDAE (part).

6. Hindwings with 8 more or less distinctly connected with cell, termen usually sinuate . . . 2. Gelechiadae.
„ 8 not connected with cell, termen not sinuate . . . . 7.
7. Hindwings with 6 and 7 nearly parallel . . 8.
„ approximated, stalked, or coincident . 9.
8. Posterior tibiae hairy . . 3. Oecophoridae.
„ „ smooth . . 5. Plutellidae (part).
9. Hindwings elongate-ovate, over 1 5. Plutellidae (part).
„ lanceolate or linear, under 1 4. Elachistidae.

1. AEGERIADAE.

Head with appressed or rather rough hairs. Ocelli present. Antennae $\frac{1}{2}$-$\frac{4}{5}$, gradually dilated from about middle to near apex, thence rather pointed, terminating in a small hair-pencil. Labial palpi moderately long, curved, ascending, terminal joint short, pointed. Maxillary palpi rudimentary. Posterior tibiae more or less rough-haired. Forewings: 1b obsoletely furcate, 7 and 8 stalked. Hindwings 1 or over 1, elongate-ovate; 5 absent, 6 and 7 tolerably parallel, 8 absent (probably absorbed in costa).

A rather considerable family, principally inhabiting the Northern hemisphere. Imago with wings partially hyaline, forewings elongate, narrow, somewhat dilated posteriorly, apex obtuse; hindwings elongate-ovate. The species are diurnal in habit, flying in hot sunshine; their flight is usually rapid. The supposed resemblance to *Hymenoptera* is probably in most instances imaginary; but *Aegeria apiformis* seems to be a true mimic of the hornet (*Vespa crabro*), and some exotic species are faithful copies of hairy bees.

Larva elongate, with 10 prolegs; feeding in wood of trees or rootstocks of plants. Pupa with abdominal whorls of spines, segments 8-11 free, in ♂ 12 also; situated within the larval gallery.

The first two genera may be taken as developments of the third. The family is derived from forms of *Plutellidae* (allied to *Heliostibes*) transitional between the *Simaethis* group and the *Gelechiadae*.

Tabulation of Genera.

1. Hindwings with 3 and 4 separate . 3. Sciapteron.
„ „ 3 and 4 stalked . . . 2.

2. Tongue rudimentary; 7 of forewings to termen
1. AEGERIA.
„ developed; 7 of forewings to apex
2. TROCHILIUM.

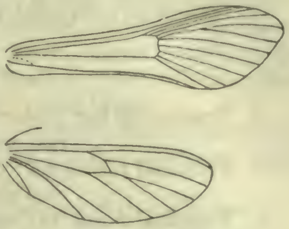
1. AEGERIA, *F.*

Head shortly rough-haired above. Tongue rudimentary. Antennae ½, in ♂ lamellate. Labial palpi with second joint rough-scaled beneath, terminal loosely scaled. Abdomen stout. Forewings: 7 to termen. Hindwings: 3 and 4 stalked.

A small genus, characteristic of the European region. The imagos are seldom observed, though the larvae are common.

Collar yellow . . . 2. *crabroniformis.*
„ dark fuscous . . . . 1. *apiformis.*

1. **A. apiformis**, *Cl.* 33-44 mm. Head yellow. Thorax blackish, with a yellow patch on each side anteriorly. Abdomen black, with yellow bands except on segment 3. Posterior legs internally orange. Forewings hyaline; costal and dorsal streaks and margins of cell ferruginous-brown; veins 2-8 dark fuscous; cilia fuscous or dark fuscous. Hindwings hyaline; veins and cilia dark fuscous.



Neuration of *Aegeria apiformis.*

Britain to the Clyde, local; Europe, Asia Minor, NW. Asia, N. America; 6, 7. Larva ochreous-whitish; head reddish-brown; plate of 2 yellow-brownish: in trunk and roots of poplar; 8-4, but sometimes living two years.

2. **A. crabroniformis**, *Lew.* (*bembeciformis*, Hb.) 31-44 mm. Head and thorax dark fuscous, collar yellow. Abdomen with four or more yellow bands. Forewings hyaline; costa, base of dorsum, and veins to end of cell ferruginous-orange, veins posteriorly black; cilia dark fuscous. Hindwings hyaline; veins and cilia dark fuscous.

Britain to the Clyde, N. Ireland, local; Holland, Germany; 6, 7. Larva ochreous-whitish; head reddish-brown; plate of 2 yellow-brownish: in stems of *Salix*; 8-6.

2. TROCHILIUM, *Sc.*

Head with appressed hairs. Tongue developed. Antennae ¾-⅘, in ♂ sometimes subdentate, ciliated. Labial palpi with second joint thickened with rough scales beneath, terminal loosely scaled. Abdomen with large flattened expansible anal tuft. Forewings: 7 to apex. Hindwings: 3 and 4 stalked.

A considerable genus, but mainly confined to the European region, with a few species in other parts of the Northern hemisphere, and two or three stragglers further south. The species are on the whole so difficult of observation that they are probably much overlooked; the imagos require a knowledge of their special habits, and are even then hard to see, sometimes almost invisible on the wing; and those larvae which feed in solid wood are troublesome to obtain.

1. Face wholly black 2
,, white at least on sides . . . 3
2. Antennae with white subapical band . 2. *spheciforme.*
,, without white band . 3. *andreniforme.*
3. Forewings with subdorsal hyaline area reaching transverse vein . . 4.
,, ,, ,, ,, absent or not reaching transverse vein 9.
4. Transverse bar posteriorly orange . 5. *asiliforme.*
,, ,, not orange . . . 5.
5. Terminal fascia red . . 8. *formiciforme.*
,, ,, not red . . . . 6.
6. Terminal fascia suffused with yellow . 4. *tipuliforme.*
,, ,, not suffused with yellow . . 7.
7. Abdomen with two yellow rings . . 1. *scoliiforme.*
,, ,, one red (seldom white) band . 8.
8. Palpi beneath reddish-orange . . 7. *culiciforme.*
,, ,, not orange . . 6. *myopiforme.*
9. Forewings marked with orange-red . . 10.
,, without red scales . 10. *musciforme.*
10. Anal tuft reddish-orange . 11. *chrysidiforme.*
,, ,, not orange . . 9. *ichneumoniforme.*

1. **T. scoliiforme,** *Bkh.* 25-34 mm. Head with white vertical bar before each eye and yellow ring at back. Antennae broadly ochreous-white towards apex. Abdomen with yellow rings on 2 and 4; anal tuft orange. Forewings hyaline; costal and dorsal streaks black sprinkled with yellow; veins, a broad bar on transverse vein projecting angularly towards base, and broad terminal fascia narrowed to tornus violet-black. Hindwings hyaline; veins, a triangular bar on transverse vein, and termen black.

Denbigh, Perth and Argyll to Sutherland, local and uncommon; N. and C. Europe; 6, 7. Larva whitish-ochreous, pinkish-tinged; head brown: in bark of birch; 8-4.

2. **T. spheciforme,** *Gern.* 27-30 mm. Head wholly black. Antennae with broad ochreous-white subapical band. Abdomen with yellow ring on 2; anal tuft black. Forewings hyaline; costal and dorsal streaks, veins, a thick bar on transverse vein, and broad terminal fascia narrowed to tornus violet-black. Hindwings hyaline; veins, a triangular mark on transverse vein, and termen violet-black.

England to York, local; N. and C. Europe, N. Asia; 6. Larva whitish-ochreous, pinkish-tinged; head red-brown; plate of 2 outlined with brownish: in stems of alder; 9-5.

3. **T. andreniforme,** *Lasp.* (*allantiformis*, Wd.) 20-22 mm. Head wholly black. Abdomen with yellow rings on 2 and 4; anal tuft partly yellow. Forewings hyaline; costal and dorsal streaks, veins, a thick bar on transverse vein, and terminal fascia narrowed to tornus violet-black, fascia mixed with yellow between veins. Hindwings hyaline; veins, a triangular mark on transverse vein, and termen violet-black.

Kent, Gloucester and Hereford to Leicester, local and scarce; Austria, Hungary, S. Russia; 6. Possibly the larva may feed in stems of *Cornus.*

4. **T. tipuliforme,** *Cl.* 18-20 mm. Head with white vertical bar before each eye and yellow ring at back. Abdomen with yellow rings on 2, 4, 6, and 7, one of two last sometimes absent, anal tuft black. Forewings hyaline; costal and dorsal streaks, and broad terminal fascia narrowed to tornus violet-black mixed with yellow; veins, and a thick bar on transverse vein violet-black. Hindwings hyaline; veins, a triangular spot on upper part of transverse vein, and termen violet-black.

Britain to Argyll, common; N., C., and SE. Europe, Asia Minor, N. America, Australia, New Zealand, but in the two latter regions (perhaps also elsewhere) artificially introduced; 6, 7. Larva ochreous-whitish, sometimes pinkish-tinged; head red-brown; plate of 2 pale brownish: in branches of currant (especially *Ribes nigrum*); 8-5.

5. **T. asiliforme,** *Rott.* (*cynipiformis*, Esp.) 17-25 mm. Head with white vertical bar before each eye and yellow ring at back. Abdomen with yellow rings on 2, 4, 6, 7, one of the two last sometimes absent; anal tuft usually partly yellow. Legs yellow, tibiae with black bands. Forewings hyaline; costal and dorsal streaks and bar on transverse vein purple-black mixed with orange; veins and terminal fascia narrowed to tornus purple-

black. Hindwings hyaline; costa yellow; veins, triangular spot on upper part of transverse vein, and termen black.

S. England to Stafford, Westmoreland, local; C. and S. Europe, Asia Minor, N. America; 6, 7. Larva ochreous-whitish, pinkish-tinged; head red-brown; plate on 2 brownish-tinged: in bark of oak; 8-5, but sometimes living two years.

6. **T. myopiforme**, *Bkh.* 17-21 mm. Head with white vertical bar before each eye. Abdomen with red band on 4; anal tuft black. Forewings hyaline; costal and dorsal streaks, veins, a thick bar on transverse vein, and terminal fascia narrowed to tornus purple-black. Hindwings hyaline; veins, a triangular spot on upper part of transverse vein, and termen black.

England to York, local; C. and SE. Europe; 6-8. Larva ochreous-whitish, pinkish-tinged; head red-brown; plate of 2 brown-tinged: in bark of apple, pear, and *Pyrus aucuparia;* 8-6.

7. **T. culiciforme**, *L.* 23-28 mm. Differs from *T. myopiforme* as follows: palpi beneath reddish-orange; forewings towards base mixed with orange.

Britain to Caledonian Canal, S. Ireland, local; N. and C. Europe, Asia Minor, N. Asia; 6, 7. Larva ochreous-whitish; head red-brown; plate of 2 yellow-brownish: in stems of birch; 8-5.

8. **T. formiciforme**, *Esp.* 20-23 mm. Head with white vertical bar before each eye. Palpi beneath reddish-orange. Abdomen with 2 and 3 yellow-sprinkled, 4 red. Forewings hyaline; costal and dorsal streaks violet-black mixed with orange-red; veins and a bar on transverse vein black; terminal fascia narrowed to tornus red. Hindwings hyaline; veins, a spot on upper part of transverse vein, and termen black.

England to York, local; N., C., and SE. Europe; 6. Larva whitish; head brown; plate of 2 yellow-brownish: in stems of *Salix viminalis* and *S. alba;* 8-5.

9. **T. ichneumoniforme**, *F.* 17-20 mm. Face yellow-whitish on sides or wholly. Abdomen with more or less developed yellow rings on all segments. Forewings hyaline; costal and dorsal streaks, veins, a bar on transverse vein, and termen dark fuscous; dorsal streak anteriorly red-mixed, broader on posterior half; bar red-margined posteriorly; terminal fascia dull red. Hindwings hyaline; veins, a spot on upper part of transverse vein, and termen dark fuscous.

England to York, Argyll, rather common; Europe, Asia Minor to Syria, N. Asia, N. Africa; 7. Larva ochreous-whitish, pinkish-tinged; head brown, pale-marked; plate of 2 more ochreous: in stems and roots of *Lotus corniculatus;* 8-6.

10. **T. musciforme**, *View.* (*philanthiformis*, Lasp.) 16-18 mm. Face white on sides. Abdomen with fine white rings on 2, 4, and 6. Forewings hyaline; costal and dorsal streaks, veins, a thick bar on transverse vein, and terminal fascia dark fuscous; dorsal streak reaching margin of cell nearly throughout; fascia mixed with fuscous-whitish. Hindwings hyaline; veins, a triangular spot on transverse vein, and termen dark fuscous.

Cornwall to I. of Man, Scotland to Caledonian Canal, E. Ireland, on coasts, local; C. Europe; 6, 7. Larva ochreous-whitish; head light reddish-brown; plate of 2 pale brownish: in stocks of *Statice armeria;* 8-5.

11. **T. chrysidiforme**, *Esp.* 17-20 mm. Face white. Abdomen with pale yellowish rings on 4 and 6; anal tuft reddish-orange, sides black. Forewings orange-red, with small hyaline discal and posterior patches; costal streak and a square spot on transverse vein touching it indigo-black; a dark purplish-fuscous terminal suffusion. Hindwings hyaline; veins, a spot on upper part of transverse vein, and termen black.

Kent, Sussex, on coasts, local; WC. and SW. Europe; 6, 7. Larva brownish-whitish; head and plate of 2 reddish-brown: in roots of *Rumex;* 8-5.

3. SCIAPTERON, *Stgr.*

Head with appressed hairs. Tongue developed. Antennae $\frac{3}{4}$, in ♂ with strongly ciliated lamellae. Labial palpi with second joint clothed with dense projecting hairs beneath, terminal loosely haired. Abdomen with expansible anal tuft. Forewings: 7 to apex. Hindwings: 3 and 4 separate.

A moderate genus, almost confined to the more southern parts of Asia, with one European species only.

1. **S. tabaniforme**, *Rott.* (*vespiforme*, Westw., non L.) 28-31 mm. Head with white vertical bar before each eye, and yellow posterior ring. Abdomen with yellow rings on 2, 4, 6, and sometimes 7. Middle and posterior tibiae orange, black-banded. Forewings rather dark fuscous, with elongate obscure hyaline patch towards base; costal streak violet-blackish. Hindwings hyaline; veins and termen dark fuscous.

Essex, scarce or a casual immigrant only; Europe, Syria; 6, 7. Larva in stems and roots of poplar; 9-5

2. GELECHIADAE.

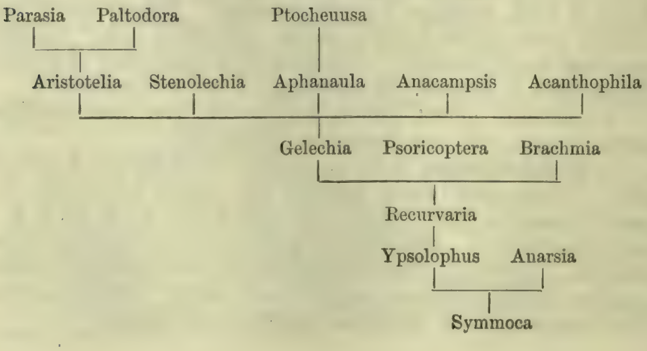
Head smooth. Tongue developed. Antennae $\frac{3}{4}$-$\frac{4}{5}$, in ♂ simple or shortly ciliated, basal joint usually without pecten. Labial palpi long, curved, ascending, terminal joint pointed, usually slender and very acute. Maxillary palpi very short, appressed. Posterior tibiae usually more or less rough-haired. Forewings: 1b furcate, 7 and 8 stalked, 7 to costa or rarely to apex. Hindwings sometimes over 1, more or less trapezoidal, termen usually sinuate or emarginate; all veins present, 6 and 7 usually stalked or approximated at base, 8 more or less distinctly connected with cell in middle.

An extremely large family, dominant almost throughout the globe, but not numerous in New Zealand. It is almost always recognisable by the peculiar form of the hindwings, which in their more characteristic developments are different from those of any other *Lepidoptera*, or indeed any other insects. The earliest genera, which have simply elongate-ovate hindwings, approximate to the *Oecophoridae*, but can be separated from them by 6 and 7 not being parallel.

Larva with 10 prolegs, rarely almost apodal; usually feeding amongst spun leaves or shoots, sometimes in seed-heads or roots, seldom mining or case-bearing. Pupa with segments 9-11 free; not protruded from cocoon in emergence.

The phylogeny of the leading genera is given in the diagram.

Phylogeny of Gelechiadae


Parasia
Paltodora
Ptocheuusa
Aristotelia
Stenolechia
Aphanaula
Anacampsis
Acanthophila
Gelechia
Psoricoptera
Brachmia
Recurvaria
Ypsolophus
Anarsia
Symmoca

Tabulation of Genera.

1. Terminal joint of palpi with scale-projection above 2.
,, ,, ,, without projection above . 3.
2. Forewings with 7 and 8 out of 6 . . 20. Chelaria.
,, ,, 6 separate . 14. Psoricoptera.
3. Second joint of palpi with tuft or long hairs beneath 4.
,, ,, ,, at most rough-scaled . 6.
4. Hindwings with 5 rising nearer 6 . 3. Paltodora.
,, ,, ,, nearer 4 . . 5
5. Terminal joint of palpi in ♂ very short, concealed 19. Anarsia.
,, ,, ,, ,, long, exposed 18. Ypsolophus.
6. Forewings with 8 out of 6 . . . 7.
,, ,, out of 7 or absent . . 12.
7. Forewings with 4 absent . . 6. Ptocheuusa.
,, ,, 4 present . . . 8.
8. Hindwings with 3 and 4 connate . . . 9.
,, ,, ,, remote, parallel . 10.
9. Hindwings with 6 and 7 stalked . . 8. Epithectis.
,, ,, ,, somewhat approximated 7. Aphanaula.
10. Hindwings with 6 and 7 stalked . . 2. Sitotroga.
,, ,, ,, somewhat approximated 11.
11. Palpi loosely scaled . . . 1. Parasia.
,, smooth-scaled . 4. Aristotelia (*bifractella*).
12. Forewings with 9 out of 7 . . . 13.
,, ,, 9 separate . . . 14.
13. Forewings with 2 and 3 stalked . . 16. Brachmia.
,, ,, ,, separate . 10. Acanthophila.
14. Forewings with 3 absent . . 5. Stenolechia.
,, ,, all veins present . . . 15.
15. Hindwings with 3 and 4 remote . . . 16.
,, ,, ,, connate . . . 17.
16. Hindwings with 6 and 7 stalked . 11. Xenolechia.
,, ,, ,, separate 4. Aristotelia.
17. Second joint of palpi smooth-scaled . . 18
,, ,, ,, more or less rough beneath . 21.
18. Terminal joint of palpi distinctly longer than second 19.
,, ,, ,, not longer than second . 20.
19. Termen of hindwings sinuate beneath apex 9. Anacampsis.
,, ,, not sinuate . 13. Tachyptilia.
20. Hindwings over 1, termen sinuate 17. Recurvaria.

Hindwings 1 or less, termen not sinuate . 21. Symmoca.
21. Abdomen flattened . . 15. Platyedra.
,, not flattened . . . 12. Gelechia.

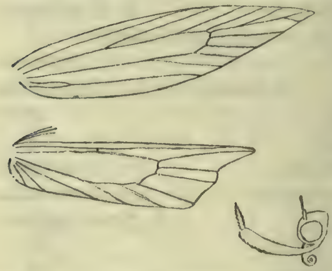
1. Parasia, *Dup.*

Labial palpi very long, more or less thickened with somewhat loose scales, terminal joint much shorter than second. Forewings: 7 and 8 out of 6. Hindwings under 1, elongate-trapezoidal, apex acute, produced, termen sinuate, cilia 2; 3 and 4 remote, parallel, 5 approximated to 6, 6 and 7 somewhat approximated.

A small northern temperate genus, derived from *Aristotelia.* Imago with forewings elongate, narrow, pointed. Larva feeding in seedheads of *Compositae* and allies.

1. Terminal joint of palpi slender . . 3. *carlinella.*
,, ,, ,, thick . . . 2.
2. Stigmata marked . . . . 3.
,, not marked . . 1. *neuropterella.*
3. Forewings pale dull ochreous . . 4. *lappella.*
,, yellowish and reddish-ochreous 2. *metzneriella.*

1. **P. neuropterella**, *Z.* 15-19 mm. Terminal joint of palpi thick, less than half second. Forewings whitish-ochreous, along costa and towards apex reddish-ochreous; veins marked with dark brown lines, terminally suffused; suffused spots on costa at base, beyond middle, and apex, and an oblique sometimes interrupted bar from costa before middle dark brown. Hindwings grey.



Neuration and head of *Parasia neuropterella.*

Kent, Surrey, Westmoreland, local; C. and SE. Europe; 7, 8. Larva in seedheads of *Dipsacus* and *Carlina;* 10-5.

2. **P. metzneriella**, *Stt.* 15-19 mm. Terminal joint of palpi thick, half second. Forewings pale yellow-ochreous, towards costa reddish-ochreous; margins and veins more or less suffused with grey, sprinkled with dark fuscous; stigmata black, first discal much beyond plical. Hindwings grey.

Kent to Hants and Norfolk, Cheshire to Durham, local; C. Europe; 6-8. Larva yellow-whitish; head and plate of 2 dark fuscous: in seedheads of *Centaurea nigra;* 10-4.

3. **P. carlinella**, *Stt.* 13-16 mm. Terminal joint of palpi slender, ⅔ of second. Forewings pale ochreous, more or less wholly suffused with reddish-ochreous; margins and veins partly marked with fuscous lines. Hindwings grey.

England, local; C. Europe; 6, 7. Larva whitish; head and plate of 2 blackish: in seedheads of *Carlina vulgaris;* 10-4.

4. **P. lappella**, *L.* 17-20 mm. Terminal joint of palpi thick, half second. Forewings pale dull ochreous, more or less streaked or suffused with brown; stigmata blackish, sometimes indistinct, first discal much beyond plical. Hindwings grey.

England, local; Europe, WC. Asia to Turkestan; 6, 7. Larva whitish; head dark fuscous: in seedheads of *Arctium lappa;* 9-4.

2. SITOTROGA, *Hein.*

Basal joint of antennae long, with pecten. Labial palpi with second joint rough beneath, terminal longer than second. Forewings: 7 and 8 out of 6. Hindwings under 1, elongate-trapezoidal, apex pointed, produced, termen emarginate, cilia 2; 3, 4, 5 remote and parallel, 6 and 7 stalked.

Includes only the single species; a development of *Aristotelia.* Imago with forewings elongate, narrow, pointed.

1. **S. cerealella**, *Ol.* 11-16 mm. Head ochreous-whitish. Forewings pale ochreous, more or less sprinkled with brownish; plical and second discal stigmata blackish; often a blackish tornal dot; some black scales at apex and on an apical bar in cilia. Hindwings grey.

Dorset, Norfolk, Lancashire, Lanark, very local, doubtless introduced; C. and S. Europe, N. America, Australia; 5, 6. Larva in grains of wheat, maize, etc.; 10-3. Probably not a true native of Europe, but its origin is uncertain. The imago much resembles a fragment of chaff.

3. PALTODORA, *Meyr.*

Second joint of labial palpi with long rough spreading hairs beneath, terminal as long as second. Forewings: 7 and 8 out of 6. Hindwings under 1, elongate-trapezoidal, apex pointed, produced, termen emarginate, cilia 3; 3 and 4 remote, parallel, 5 nearer 6, 6 and 7 approximated.

A small genus, but very widely distributed. Imago with forewings elongate, narrow, pointed.

Second discal stigma black . . . 1. *striatella.*
,, ,, ,, absent . . 2. *cytisella.*

1. **P. striatella,** *Hb.* 11-13 mm. Head ochreous-whitish. Forewings dark brown; an indistinct ochreous-whitish longitudinal line in disc and another along fold, interrupted on anterior stigmata; second discal stigma black; a fine white line from $\frac{4}{5}$ of costa to termen; some whitish dashes in cilia. Hindwings dark grey.

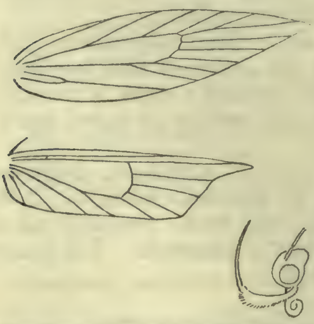
Kent to Hants and Cambridge, local; C. Europe, WC. Asia to N. Persia, N. America; 7, 8. Larva in stems of *Tanacetum;* 10-5.

2. **P. cytisella,** *Curt.* 10-11 mm. Head ochreous-whitish. Forewings ochreous-yellowish, towards costa sprinkled or suffused with fuscous; a yellowish-white streak from $\frac{2}{3}$ of costa towards termen, not reaching it; usually an indistinct outwardly oblique whitish tornal mark. Hindwings grey.

England, S. Ireland, rather local; C. and SE. Europe; 7.

4. ARISTOTELIA, *Hb.*

Second joint of labial palpi thickened with appressed scales or sometimes rough beneath, terminal nearly as long or longer. Forewings: 6 sometimes out of 7, rarely 7 and 8 out of 6. Hindwings 1 or somewhat less, elongate-trapezoidal, apex pointed, produced, termen sinuate or emarginate, cilia $1\frac{1}{4}$-3; 3, 4, 5 remote, nearly parallel, 6 and 7 remote or somewhat approximated.



Neuration and head of *Aristotelia ericinella.*

A genus of some extent, but principally characteristic of the Northern hemisphere. Imago with forewings elongate, narrow, pointed.

1. Forewings with pale transverse markings before middle . . . . 2.
,, without such markings . . 7.
2. Forewings bright orange . . . 1. *hermannella.*
,, not orange . . . . 3.
3. Forewings whitish-ochreous . . 7. *brizella.*
,, not whitish-ochreous . . . 4.

4. Forewings with dorsum reddish-ochreous . 5.
,, ,, ,, not reddish-ochreous . 6.
5. Fasciae rosy-silvery, well-defined . . 6. *ericinella.*
,, whitish, ill-defined . 5. *subdecurtella.*
6. Forewings with silvery fascia at $\frac{3}{4}$. 3. *pictella.*
,, without such fascia . . 4. *tarquiniella.*
7. Forewings with yellow median subdorsal spot 2. *stipella.*
,, without such spot . . . 8.
8. Head and palpi orange . . . 8. *bifractella.*
,, ,, ,, not orange . . . 9.
9. Veins of forewings marked with pale streaks 20. *palustrella.*
,, ,, not streaked . . . 10
10. Head whitish 11
,, not whitish . . . . 13.
11. Forewings with black costal dot at $\frac{2}{3}$. 19. *suffusella.*
,, without black costal dot . . 12.
12. Costa broadly suffused with ochreous-whitish 21. *divisella.*
,, not paler . . . . 18. *tetragonella.*
13. Abdomen at least partly yellowish . . 14.
,, not yellowish . . . . 15.
14. Forewings with whitish posterior costal spot 17. *elongella.*
,, without whitish costal spot 12. *lutulentella.*
15. Forewings with pale oblong patch in disc 16. *lucidella.*
,, without such patch . . . 16
16. Forewings with distinct whitish-ochreous tornal spot . . . 9. *atrella.*
,, without such spot . . . 17.
17. Posterior tibiae ochreous-yellowish . . 18.
,, ,, not ochreous-yellowish . . 19.
18. Forewings purplish-tinged, without pale costal mark 13. *morosa.*
,, not purplish-tinged, usually with pale costal mark . 14. *quaestionella.*
19. Forewings with pale costal spot . 15. *arundinetella.*
,, without pale costal spot . . 20.
20. Forewings dark shining bronzy . . 10. *tenebrella.*
,, brownish, irrorated with pale 11. *pulveratella.*

1. **A. hermannella**, *F.* 8-9 mm. Head and thorax metallic brassy-grey. Forewings bright orange; a fascia before middle and about eight irregular spots leaden-metallic, mostly margined irregularly with black; apex black. Hindwings grey.

Kent to Cheshire and York, local; N. and C. Europe, WC. Asia to N. Persia, N. America; 5, 6, 8. Larva yellow-whitish, more or less spotted with crimson; head pale brown: in greenish blotches in leaves of *Chenopodium* and *Atriplex;* 7, 9.

2. **A. stipella,** *Hb.* (*naeviferella*, Dup.) 8-10 mm. Head metallic brassy-grey. Forewings dark purplish-grey, mixed with black, with some whitish scales; a yellow subdorsal spot in middle, and a smaller one in disc posteriorly; an ill-defined ochreous-white tornal spot, and another on costa at $\frac{3}{4}$. Hindwings grey.

England, E. Ireland, common; C. and S. Europe, Asia Minor; 5, 6, 8. Larva yellow-whitish; dorsal line brownish; lateral line of orange-reddish spots; head pale brown; plate of 2 blackish: in whitish blotches in leaves of *Chenopodium* and *Atriplex;* 6, 9, 10. Only the variety *naeviferella*, which is the form described above, occurs in Britain; the typical *stipella*, which has the yellow markings much more largely developed, is South European.

3. **A. pictella,** *Z.* ♂ 9-10 mm., ♀ 8 mm. Head white. Antennae with apical third white. Forewings blackish; two bars from costa, at $\frac{1}{4}$ and $\frac{1}{2}$, a straight sometimes interrupted oblique fascia at $\frac{3}{4}$, and an apical spot silvery-metallic; white spots in cilia on costal extremity of fascia and at apex. Hindwings pale grey.

Kent to Dorset and York, Lancashire, local, in sandy places; C. Europe, Asia Minor; 6, 8. Larva light rosy; head pale brown; 2 brownish: in silken galleries on *Cerastium triviale;* 5, 7.

4. **A. tarquiniella,** *Stt.* Differs from *A. pictella* in the absence of the posterior silvery fascia of forewings.

E. Ireland (Dublin), on sandhills, local; not recorded elsewhere; 6. Possibly a geographical form of *A. pictella.*

5. **A. subdecurtella,** *Stt.* 12-14 mm. Forewings dark fuscous, with a broad light reddish-ochreous dorsal streak ending in a bar at tornus; three very ill-defined fasciae of white irroration more distinct dorsally, first almost basal, second about $\frac{1}{3}$, oblique, third beyond middle, broad; silvery-white opposite costal and tornal spots at $\frac{3}{4}$, sometimes connected; an indistinct fine blackish line along fold; stigmata blackish, ill-defined. Hindwings grey.

Norfolk, Cambridge, local, in fens; N. Germany; 7. Larva in spun shoots of *Lythrum salicaria;* 6.

6. **A. ericinella,** *Dup.* 12-13 mm. Forewings dark fuscous; a dorsal streak to beyond middle, and sometimes a posterior spot in disc reddish-ochreous; a spot on dorsum at base, an

oblique fascia at $\frac{1}{4}$, a costally furcate fascia in middle, a tornal spot, a costal spot beyond it, and some terminal dots rosy-silvery; stigmata sometimes obscurely blackish. Hindwings grey.

England to Westmoreland, common; C. Europe; 7, 8. Larva ochreous-brown, rosy-tinged; subdorsal line dark brown, partly edged with pale yellowish; spiracular pale yellowish, slender; head and front of 2 pale brown: in silken galleries on *Calluna;* 6, 7.

7. **A. brizella**, *Tr.* 10-12 mm. Forewings whitish-ochreous, along costa ochreous-brownish; four slender silvery fasciae, first three angulated in middle, often interrupted or indistinct on lower half, fourth straight, inwardly oblique; plical and second discal stigmata small, black; often a black tornal dot; some whitish terminal dots. Hindwings light grey.

Sussex to Devon and Durham, on coasts, local; Germany, Finland; 5, 6, 8. Larva yellowish-brown; spots whitish; head brown; plate of 2 black: in flower-heads of *Statice armeria;* 6, 7, 9, 10.

8. **A. bifractella**, *Dgl.* 9-12 mm. Head and palpi orange, face sometimes whitish. Forewings dark fuscous, sprinkled with grey-whitish, dorsally more or less mixed with ferruginous-orange; usually a more distinct small tornal orange mark; an ill-defined ochreous-whitish or pale orange costal spot beyond it, sometimes finely connected; veins 7 and 8 out of 6. Hindwings grey.

S. England to Hereford and Cambridge, rather common; C. and S. Europe, Asia Minor; 7, 8. Larva almost apodal, stout, whitish; head yellow-brown: in seedheads of *Inula* and *Conyza;* 10-4.

9. **A. atrella**, *Hw.* 11-13 mm. Palpi pale yellowish. Forewings dark purplish-fuscous; a triangular whitish-ochreous tornal spot, and another on costa beyond it. Hindwings grey.

England, rather common; C. Europe; 7. Larva pale whitish-green; head very pale brown; 2 with a grey plate and two black spots: in stems of *Hypericum;* 5. Pupa in a flat case formed of a portion of the mined stem.

10. **A. tenebrella**, *Hb.* (*tenebrosella*, Z.) 10-12 mm. Antennae with apical third in ♀ white. Forewings unicolorous dark shining bronzy; base of costa purplish-tinged. Hindwings grey.

England, Hebrides, common; C. and SE. Europe; 6, 7.

Larva reddish; spots brown; head and plate of 2 black-brown: in rootstocks of *Rumex acetosella;* 9-4.

11. **A. pulveratella**, *HS.* (*intaminatella*, Stt.) 10-13 mm. Forewings light brownish, densely irrorated with pale greyish-ochreous. Hindwings grey.

York, Durham, local; Germany, Dalmatia; 5, 6. Larva yellow-green, faintly reddish-tinged; dots small, black; head and 2 yellow: between joined leaves of *Lotus*, *Coronilla*, and *Medicago;* 8, 9.

12. **A. lutulentella**, *Z.* 14-16 mm. Abdomen ochreous-yellowish towards base. Forewings varying from light ochreous-brownish to dark fuscous, glossy; second discal stigma indistinctly darker. Hindwings very pale grey.

Kent to Essex and Gloucester, very local, in dry fields; C. Europe, Asia Minor; 7.

13. **A. morosa**, *Mühl.* 11-12 mm. Posterior tibiae ochreous-yellowish. Forewings dark fuscous, sprinkled with grey, slightly purplish-tinged; stigmata very indistinctly darker, first discal much beyond plical. Hindwings grey.

Cambridge (Wicken Fen), local; Holland, Germany; 7. Larva in shoots of *Lysimachia vulgaris;* 5.

14. **A. quaestionella**, *HS.* 11-12 mm. Posterior tibiae ochreous-yellowish. Forewings dark fuscous, paler-sprinkled; stigmata very indistinctly darker, first discal much beyond plical; usually a pale outwardly oblique mark on costa at ¾. Hindwings light grey.

Cambridge (Wicken Fen), local; Germany, Switzerland; 7, 8. Larva on *Lotus corniculatus;* 5.

15. **A. arundinetella**, *Stt.* 9-10 mm. Forewings very pointed, fuscous; darker marks on costa near base, and on fold; an oblique whitish costal mark at ⅔, beneath which is a short blackish dash; sometimes some whitish scales on tornus opposite this, preceded by a darker suffusion. Hindwings light grey.

Kent to Norfolk and Cambridge, local; N. Germany; 6, 7. Larva slender, whitish; head blackish; 2 with black lateral spots: in long galleries in leaves of *Carex paludosa;* 3-5.

16. **A. lucidella**, *Stph.* 12-14 mm. Forewings very pointed, fuscous, unevenly sprinkled with ochreous-whitish, sometimes forming indistinct darker and lighter fasciae; an oblong ochreous-whitish suffusion in disc at ⅔ followed by a dark fuscous dot; a very indistinct ochreous-whitish tornal spot beneath this, and costal spot beyond it. Hindwings grey.

Surrey to Dorset and Lancashire, local; C. Europe; 6, 7.

17. **A. elongella**, *Hein.* 12-13 mm. Abdomen pale ochreous-yellowish. Forewings fuscous; stigmata darker, indistinct, first two elongate, first discal much beyond plical; indistinct darker elongate marks in disc towards base, beneath costa before middle, and below first discal stigma; some whitish scales on tornus, and a whitish spot on costa opposite. Hindwings grey.

Pembroke, very local; Germany; 6.

18. **A. tetragonella**, *Stt.* 9-11 mm. Head and palpi ochreous-whitish, tip of palpi dark fuscous. Forewings light fuscous, more or less sprinkled with dark fuscous; a dot in disc towards base, another below costa at $\frac{2}{5}$, and stigmata dark fuscous, first discal much beyond plical. Hindwings pale grey.

Dorset, Norfolk, York, in salt-marshes, local; not recorded elsewhere; 7.

19. **A. suffusella**, *Dgl.* (*oblitella*, Dbld.) 10-13 mm. Head whitish. Forewings whitish-ochreous, posteriorly irrorated with brown, costal edge whitish; second discal stigma dark fuscous; a black costal dot above it. Hindwings pale grey.

Dorset, Norfolk, Cambridge, Cheshire, local; Holland, Germany; 6, 7.

20. **A. palustrella**, *Dgl.* 17-19 mm. Forewings pale brown, veins more or less marked with whitish streaks, interneural spaces mixed with blackish; stigmata blackish, whitish-edged, plical and first discal elongate, second discal roundish. Hindwings light grey.

Kent, Norfolk, Cambridge, in marshes, very local; Holland; 7.

21. **A. divisella**, *Dgl.* 15-16 mm. Head ochreous-whitish. Forewings brownish, sprinkled with ochreous-whitish, costa broadly suffused with ochreous-whitish, lower edge of suffusion running straight from middle of base to apex; plical and second discal stigmata black, former elongate. Hindwings light grey.

Norfolk, Cambridge, in fens, very local; not recorded elsewhere; 6, 7.

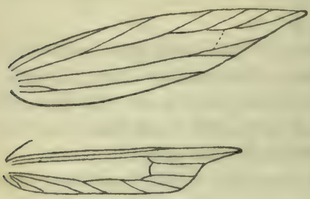
5. STENOLECHIA, *Meyr.*

Second joint of labial palpi somewhat rough beneath, terminal shorter than second. Forewings: 3 absent, 4 sometimes absent. Hindwings under 1, elongate-trapezoidal, apex acute, produced, termen emarginate, cilia 3; 3, 4, 5 remote, tolerably parallel, 6 and 7 stalked or separate.

Only the two following species are known; the genus is derived from *Gelechia*. Imago with forewings elongate, narrow, pointed.

Forewings with inwardly oblique black fascia 1. *gemmella*.
„ without such fascia . . 2. *albiceps*.

1. **S. gemmella**, *L.* (*nivea*, Hw.) 9-11 mm. Head white. Forewings whitish, somewhat sprinkled with brownish; a spot on costa near base and another at ⅓, an inwardly oblique fascia beyond middle, somewhat interrupted near costa, a spot on base of dorsum, and another at tornus black; some black scales towards apex; vein 4 absent. Hindwings light grey.



Neuration of *Stenolechia gemmella*.

England to Westmoreland, in woods, not uncommon; C. Europe; 8, 9. Larva whitish; spots pale grey; head and plate of 2 yellow-brown, latter grey-speckled: in buds and shoots of oak; 6.

2. **S. albiceps**, *Z.* 9-12 mm. Head white. Forewings fuscous, sprinkled with white, and much mixed with black; a very irregular oblique fascia about ¼, a spot on costa about middle and another towards apex, and a dorsal spot before tornus white, two latter connected by a bent line; these markings are variable and sometimes partly confluent; vein 4 present. Hindwings grey, thinly scaled basally.

England to York, local; C. Europe; 7, 8.

6. PTOCHEUUSA, *Hein.*

Second joint of labial palpi smooth-scaled, terminal as long as second. Forewings: 4 absent, 7 and 8 out of 6. Hindwings under 1, elongate-trapezoidal, apex pointed, produced, termen emarginate, cilia 3; 3 and 4 connate, 6 and 7 connate or stalked.

A small genus, not identified beyond the European region. Imago with forewings elongate, narrow, pointed.

1. Forewings with black discal dots or marks . 2.
„ without black dots . . . 3.
2. Forewings with two yellow streaks . 3. *littorella*.
„ without yellow streaks . 4. *subocellea*.
3. Forewings yellowish with white markings 2. *inopella*.
„ without markings . . 1. *osseella*.

1. **P. osseella**, *Stt.* 10-12 mm. Forewings whitish-ochreous, finely irrorated with brownish. Hindwings light grey.

Kent, Norfolk, Hereford, York, Lancashire, very local; Germany, N. Africa; 6, 7.

2. **P. inopella**, *Z.* (*paupella*, Z.) 10-12 mm. Forewings light ochreous-yellow, with some black scales mostly arranged in longitudinal rows; margins, a median longitudinal streak from base to middle, an indistinct inwardly oblique slender fascia before middle and another at $\frac{3}{4}$, and sometimes two or three faint longitudinal lines in disc posteriorly white. Hindwings pale grey.

England to Lancashire, local; C. and CS. Europe, Asia Minor; 6, 8, 9. Larva pale yellowish; head and two spots on 2 dark fuscous: in seedheads of *Inula dysenterica;* 7, 9, 10.

3. **P. littorella**, *Dgl.* 11-12 mm. Forewings grey-whitish, fuscous-sprinkled; a blackish subcostal dot at $\frac{1}{3}$; stigmata black, plical before first discal, preceded by a black dot, both placed in a longitudinal ochreous-yellow streak, two discal placed in a similar streak; terminal black dots. Hindwings grey-whitish.

I. of Wight, Cheshire, on coasts, scarce and local; CS. and SE. Europe; 5.[1]

4. **P. subocellea**, *Stph.* 10-11 mm. Forewings whitish, apex and usually margins more or less sprinkled with fuscous; an indistinct fuscous dorsal streak to beyond middle; a dark fuscous elongate mark above tornus; a black elongate mark in disc beyond it; a black apical dot; three dark lines in apical cilia. Hindwings grey.

England to York, local; C. Europe; 7, 8. Larva whitish-ochreous; dots dark brown; head and plate of 2 brown: in seedheads of *Origanum*, forming a portable case of the husks; 8-11.

7. APHANAULA, *n.g.*

Second joint of labial palpi rough beneath, terminal shorter than second. Forewings: 7 and 8 out of 6. Hindwings under 1, elongate-trapezoidal, apex acute, termen sinuate, cilia $1\frac{2}{3}$; 3 and 4 connate, 5 approximated, 6 and 7 somewhat approximated.

Only the two species are yet known; the genus is a development of *Gelechia*. Imago with forewings elongate, narrow, pointed.

---

[1] I have not been able to examine the neuration of this species.

Forewings with broad white fascia . .	2. *leucatella*.
„ without such fascia . .	1. *nanella*.

1. **A. nanella**, *Hb.* 11-12 mm. Forewings dark grey, whitish-sprinkled, especially beyond dark markings; an oblique narrow fascia rather near base, a spot on costa before and another beyond middle, stigmata, a spot below second discal and separated from it by a white mark, a spot on tornus, another in disc beyond it, and one at apex black, variable in development; an indistinct fine whitish sharply angulated transverse posterior line. Hindwings grey.

Kent to Gloucester and Essex, local; C. Europe; 7. Larva brown-reddish; head and plate of 2 black: variously said to feed on flowers and in shoots of pear, or on lichens growing on the trunks; 5.

2. **A. leucatella**, *L.* 12-13 mm. Head ochreous-white. Forewings dark fuscous; a broad white or ochreous-white fascia at $\frac{1}{3}$; stigmata and a dot below second discal indistinctly blackish, somewhat raised; a white spot on tornus, and another on costa opposite; some white terminal scales. Hindwings grey.

England to York, not uncommon; Europe, Asia Minor; 7. Larva light brown to whitish-green, more or less rosy-tinged; head and plate of 2 black: between joined leaves of hawthorn and apple; 5, 6.

8. Epithectis, *n.g.*

Second joint of labial palpi thickened with rough scales beneath, terminal nearly as long as second, somewhat roughened anteriorly. Forewings: 7 and 8 out of 6. Hindwings 1, trapezoidal, apex pointed, termen somewhat sinuate, cilia 1; 3 and 4 connate, 5 somewhat approximated, 6 and 7 stalked.

A small northern temperate genus, correlated with the preceding. Imago with forewings elongate, pointed.

Forewings yellow	1. *lathyri*.
„ light brownish . . .	2. *mouffetella*.

1. **E. lathyri**, *Stt.* (*nigricostella*, Dgl., non Dup.) 9-12 mm. Forewings pale ochreous-yellowish, suffused with deeper yellow in disc; a thick dark grey costal streak from base to $\frac{3}{4}$, including a yellow streak near base; an irregular sometimes interrupted dorsal streak and an apical patch dark grey; a black discal dot near base; first discal stigma and a small round spot above tornus black. Hindwings light grey.

Norfolk, Cambridge, Cheshire, Perth, local; not recorded elsewhere; 6, 7. Larva dull green; head and plate of 2 black: in a slight web on *Lathyrus palustris;* 8, 9.

2. **E. mouffetella**, *Schiff.* 14-17 mm. Forewings light ashy-brown, irrorated with paler, faintly rosy-tinged; some minute black dots near base and on termen; stigmata and a dot obliquely beneath and before second discal black, first discal beyond plical. Hindwings grey.

England, S. Ireland, rather local; C. Europe; 7. Larva blackish-grey; dorsal line whitish on incisions between 2 and 4; spiracular indistinct, whitish, clearer anteriorly; head and plate of 2 black: between spun leaves of *Lonicera;* 5, 6.

9. Anacampsis, *Curt.*

Labial palpi very long, second joint smooth-scaled, terminal longer than second. Forewings: 6 sometimes out of 7 near base. Hindwings under 1, elongate-trapezoidal, apex acute, produced, termen sinuate, cilia 1½-2; 3 and 4 connate, 5 approximated, 6 and 7 stalked.

A small genus, mainly inhabiting the European region; derived from *Gelechia.* Imago with forewings elongate, narrow, pointed. Larva feeding amongst spun leaves of *Leguminosae.*

1. Forewings with a narrow white fascia . . 2.
   „ with two opposite pale spots . . 3.
2. Fascia on under-surface distinct throughout 1. *taeniolella.*
   „ „ forming a costal spot only 2. *vorticella.*
3. Forewings with vein 6 out of 7 . . . 4.
   „ „ separate . . . 5.
4. Costal spot whitish-ochreous; a pale dot on fold 6. *anthyllidella.*
   „ white; no dot on fold . 5. *albipalpella.*
5. Forewings broader, spots pale ochreous . 3. *coronillella.*
   „ narrower, spots ochreous-whitish 4. *sangiella.*

1. **A. taeniolella**, *Z.* (*sircomella*, Stt.) 10-12 mm. Forewings bronzy-black, somewhat lighter basally; a nearly straight narrow white fascia beyond middle. Hindwings fuscous, darker posteriorly. Under-surface with white fascia distinct across forewings and forming a costal spot on hindwings.

England, E. and S. Ireland, common; C. Europe, Asia Minor; 7. Larva pale ochreous-yellowish; 3-12 with broad dull red transverse bands, on 3 and 4 somewhat interrupted; head yellow-brown; plate of 2 yellow-brown, posteriorly blackish-marked: between spun leaves of *Lotus*, *Trifolium*, *Medicago*, etc.; 5, 6. The aberration *sircomella* has no fascia.

2. **A. vorticella**, *Sc.* (*ligulella*, Z.; *cincticulella*, HS.) 10-12 mm. Forewings bronzy-black; a nearly straight narrow white fascia beyond middle. Hindwings fuscous, darker posteriorly. Under-surface with white fascia appearing only as a costal spot on forewings.

England to Westmoreland, rather local; Europe, WC. Asia to N. Persia; 6, 7. Larva pale green, suffused with reddish; head pale yellow-brown; 2 with four black semilunules filled with yellow-brown: between joined leaves of *Lotus* and *Genista*; 5, 6.

3. **A. coronillella**, *Tr.* 12-13 mm. Forewings somewhat broad, dark fuscous; stigmata indistinctly darker, first discal much beyond plical; a small pale ochreous wedge-shaped spot, slightly outwardly oblique, on tornus, and another on costa opposite; vein 6 separate. Hindwings fuscous, darker posteriorly.

Surrey (Mickleham), local; C. Europe; 6, 7. Larva greenish; subdorsal and lateral rows of dull reddish spots; head pale brownish; 2 black-marked posteriorly: between spun leaves of *Coronilla* and perhaps *Onobrychis*; 5.

4. **A. sangiella**, *Stt.* 10-14 mm. Forewings dark slaty-fuscous, slightly purple-tinged; stigmata indistinctly darker, each sometimes followed by two or three ochreous-whitish scales, first discal much beyond plical; a small ochreous-whitish triangular spot, slightly outwardly oblique, on tornus, and another on costa opposite; vein 6 separate. Hindwings grey.

Durham, local, perhaps overlooked; Germany, Switzerland; 6, 7. Larva reddish-brown, anterior incisions whitish-green; dorsal line whitish on 2-4; head yellow-brown; plate of 2 black: between joined leaves of *Lotus*; 5, 6.

5. **A. albipalpella**, *HS.* 10-11 mm. Forewings dark slaty-fuscous; a small white erect triangular spot on tornus, and another on costa opposite; vein 6 rising out of 7. Hindwings grey.

Surrey, Devon, Essex, York, local; Belgium, Germany; 7. Larva dull reddish, segmental incisions whitish-green; dorsal line green; head yellow-brown; 2 blackish-spotted: between spun leaves of *Genista anglica*; 9-6.

6. **A. anthyllidella**, *Hb.* (*nigritella*, Dgl., non Z.; *sparsiciliella*, Barr.; ? *immaculatella*, Dgl.) 10-12 mm. Forewings dark slaty-fuscous, often paler-sprinkled; stigmata hardly per-

ceptible, plical followed by a whitish-ochreous dot; a small whitish-ochreous triangular spot, usually somewhat outwardly oblique, on costa at $\frac{2}{3}$, occasionally obsolete; often a very small whitish-ochreous spot on tornus opposite; vein 6 rising out of 7. Hindwings rather light grey.

England, E. Ireland, common; C. and S. Europe, Asia Minor; 5, 6, 8. Larva blackish-grey; on 2-4 dorsal line and segmental incisions obscurely whitish; spiracular series of whitish spots; head and plate of 2 black: in folded leaves of *Anthyllis*, *Onobrychis*, *Trifolium*, etc.; 4, 5, 7.

10. Acanthophila, *Hein.*

Second joint of labial palpi thickened with appressed scales, with slight projection of scales above near apex, terminal shorter than second. Forewings: 7 and 9 stalked, 8 absent. Hindwings 1, elongate-trapezoidal, apex pointed, termen sinuate, cilia 1; 3 and 4 connate, 5 somewhat approximated, 6 and 7 stalked.

Includes only the single species; a derivative of *Gelechia*. Imago with forewings elongate, pointed.

1. **A. alacella**, *Dup.* 13-14 mm. Palpi dark fuscous, tip whitish. Forewings dark fuscous; a black spot in disc towards base; stigmata rather large, black, each followed by some ochreous-whitish scales, first discal hardly beyond plical; an ochreous-whitish costal spot at $\frac{2}{3}$; some black terminal dots, followed by ochreous-whitish spots in cilia. Hindwings fuscous, darker posteriorly.

Surrey, Hants, Norfolk, Hereford, local and uncommon; C. and SE. Europe; 7, 8. Larva grey-whitish; head and plate of 2 black: on lichens on tree-trunks; 6.

11. Xenolechia, *n.g.*

Second joint of labial palpi thickened with rough scales beneath, terminal as long as second. Forewings: 6 often out of 7 near base. Hindwings 1 or over 1, trapezoidal, apex pointed, termen sinuate, cilia over 1; 3, 4, 5 remote, 6 and 7 stalked.

A small genus, inhabiting northern temperate regions. Imago with forewings elongate, pointed.

1. Forewings clear white . . . . 3. *scalella.*
   ,, not clear white . . . . 2.
2. Forewings with black mark on base of costa 2. *humeralis.*
   ,, without such mark . . 1. *aethiops.*

1. **X. aethiops**, *Westw.* 15-17 mm. Forewings dark fuscous;

stigmata black, raised, first discal much beyond plical; a similar spot in disc obliquely before plical, another on fold rather beyond first discal, and a third close beneath second discal. Hindwings considerably over 1, grey.

Cheshire to Northumberland, common; Holland, Germany; 5, 6. Larva dull reddish, segmental incisions greenish; dots black; head brown; plate of 2 black, crescentic, bisected: in silken gallery amongst shoots of *Erica cinerea;* 6, 7.

2. **X. humeralis,** *Z.* (*lyellella,* Dbld.) 13-14 mm. Forewings ochreous-whitish, often more or less mixed or wholly suffused with fuscous, sometimes ochreous-mixed; a black mark along costa at base; stigmata large, black, very irregular, plical sometimes connected with costal mark, first discal much beyond plical. Hindwings somewhat over 1, light grey.

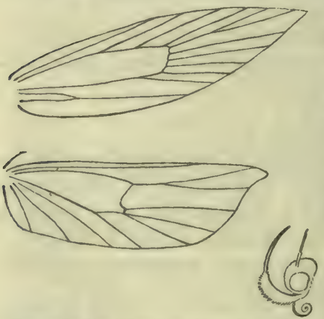
Britain to Caledonian Canal, local and not common; C. and S. Europe, Asia Minor; 7-4.

3. **X. scalella,** *Sc.* (*aleella,* F.) 13-14 mm. Forewings white; a transverse basal mark, a narrow oblique fascia at $\frac{1}{4}$, a triangular spot on middle of costa, a dot on fold below it, a spot on tornus, another on costa opposite, a dot between them, and an apical spot black. Hindwings 1, light grey.

Kent and Hants to Hereford and Cambridge, local; Europe; 5, 6. Larva said to feed on moss; 8.

12. GELECHIA, *Hb.*

Labial palpi very long, second joint thickened with more or less rough scales beneath, sometimes furrowed, terminal almost or quite as long as or longer than second. Forewings: 6 seldom out of 7 near base. Hindwings 1 or over 1, seldom under 1, trapezoidal, apex more or less pointed, termen more or less sinuate, cilia $\frac{2}{3}$-$1\frac{1}{2}$; 3 and 4 connate, 5 somewhat approximated, 6 and 7 closely approximated or connate or stalked.



Neuration and head of *Gelechia terrella.*

A very large genus, universally distributed; it may be regarded as a development of *Recurvaria.* Imago with forewings elongate, more or less pointed. Larva usually in spun shoots or leaves.

1. Hindwings 1 or less . . . . . 2.
,, over 1 . . . . 44.
2. Forewings beneath with discal patch of erect scales . . . 42. *dodecella.*
,, without such patch . . . 3.
3. Forewings with ground-colour whitish . . 4.
,, ,, ,, not whitish . 11.
4. Plical stigma confluent with black costal bar . 5.
,, not confluent . . . 7.
5. Head bronzy-grey . . . 32. *junctella.*
,, white . . . . . 6.
6. First discal stigma absorbed in costal bar 24. *maculea.*
,, ,, almost separate 25. *blandulella.*
7. A black dot below second discal stigma 39. *proximella.*
No such dot . . . . . 8.
8. Forewings with distinct white antemedian fascia 44. *sequax.*
,, without such fascia . . . 9.
9. Forewings with black costal postmedian spot 37. *scriptella.*
,, without such spot . . . 10.
10. Posterior white fascia indistinct, acutely angulated . 22. *Huebneri.*
,, ,, distinct, obtusely angulated 23. *knaggsiella.*
11. Forewings with dark triangular median costal blotch . . . . 12.
,, without such blotch . . . 13.
12. Forewings with white fascia at ¼ . 28. *tricolorella.*
,, without such fascia . . 29. *costella.*
13. Two anterior stigmata confluent with dark costal bar 14.
,, ,, not confluent . . 16.
14. Second discal stigma connected with blackish tornal spot 26. *fraternella.*
,, ,, not connected . . 15.
15. Pale posterior fascia obtusely angulated 30. *maculiferella.*
,, ,, not angulated, forming two spots . 31. *semidecandrella.*
16. First discal stigma above plical . . . 17.
,, ,, beyond plical . . . 20.
17. Forewings with raised blackish tornal bar 43. *vulgella.*
,, without such bar . . . 18.
18. With a black dot below second discal stigma 41. *triparella.*
Without such dot . . . . 19.

19. Forewings fuscous, paler-mixed in disc . 1. *basaltinella.*
„ whitish-ochreous, fuscous-sprinkled 2. *domestica.*
20. Forewings with semiannular white costal blotch 36. *luculella.*
„ without such blotch . . . 21.
21. Forewings with whitish fascia towards base . 22.
„ without such fascia . . . 23.
22. Subbasal fascia white, distinct, not reaching costa 35. *leucomelanella.*
„ „ indistinct, whitish, reaching costa 34. *vicinella.*
23. Terminal joint of palpi shorter than second . 24.
„ „ not shorter than second . 27.
24. Dorsum of forewings broadly paler . 33. *marmorea.*
„ „ not paler . . . 25.
25. Forewings with four dark costal patches . 21. *ocellatella.*
„ without such patches . . . 26.
26. Forewings sprinkled with pale yellowish . 59. *galbanella.*
„ not yellowish-sprinkled . 27. *viscariella.*
27. Forewings grey . . . . . 28.
„ ochreous-tinged, fuscous, or brown . 29.
28. A blackish sometimes interrupted streak along fold . . . . . 38. *fugitivella.*
No such streak . . . . 40. *notatella.*
29. Posterior fascia distinct, white . . . 30.
„ „ indistinct, not white . . 31.
30. Forewings with yellow-whitish basal dot . 4. *affinis.*
„ without whitish basal dot . 3. *umbrosella*
31. Terminal joint of palpi markedly longer than second . . 32.
„ „ „ about as long as second 38.
32. Forewings with slender basal black fascia 6. *mundella.*
„ without basal black fascia . . 33.
33. Forewings with dark discal dot towards base . 34.
„ without subbasal dot . . . 36.
34. Forewings with posterior pale angulated fascia 8. *senectella.*
„ without such fascia . . . 35.
35. Forewings light brownish-ochreous . 9. *desertella.*
„ rather dark fuscous . . 7. *obscurella.*
36. Forewings with pale posterior angulated fascia . 37.
Forewings without such fascia . . 10. *politella.*

37. Forewings fuscous, slightly reddish-tinged 11. *figulella*.
„ dark fuscous . . . . 5. *similis*.

38. Veins suffused with grey-whitish, dark-irrorated . 39.
„ not whitish . . . . 40.

39. Plical and second discal stigmata followed by black spots . . . . 20. *suaedella*.
Plical and second discal stigmata not followed by black spots . . . 17. *plantaginella*.

40. Dorsal area of forewings lighter . . . 41.
„ „ not lighter . . 42.

41. Forewings ferruginous-streaked . 14. *artemisiella*.
„ not ferruginous-streaked 15. *atriplicella*.

42. Costa with two dark spots near base . . 43.
„ without such spots . . 16. *obsoletella*.

43. Stigmata black . . . 18. *instabilella*.
„ dark brown . . . 19. *salicorniae*.

44. Second joint of palpi almost tufted . 47. *cuneatella*.
„ „ normal . . . 45.

45. Abdomen with 3 basal segments yellowish . 46.
„ „ „ not yellowish . 47.

46. First discal stigma white-ringed . . 46. *muscosella*.
„ „ followed by whitish-ochreous spot . 48. *pinguinella*.

47. Forewings with five pale fasciae . 64. *longicornis*.
„ not so marked . . . 48.

48. Pale fascia at ¾ obsolete . . . . 49.
„ „ more or less indicated . . 50.

49. Stigmata partly white-margined . . 63. *ericetella*.
„ not white-margined . . 62. *mulinella*.

50. Forewings whitish-sprinkled . . . 51.
„ not whitish-sprinkled . . . 55.

51. Stigmata partly white-edged . . . 52.
„ not white-edged . . . 53.

52. First discal stigma wholly white-ringed 49. *sororculella*.
„ „ not wholly white-ringed 57. *peliella*.

53. Forewings with oblique fascia of black raised marks at ¼ . . 55. *diffinis*.
„ without such fascia . . . 54.

54. With a blackish mark between discal stigmata 45. *nigra*.
Without such mark . . . 53. *solutella*.

55. Discal stigmata connected by a pale mark . 56.
„ „ not so connected . . 57.

56. Plical stigma partly whitish-edged . 58. *boreella.*
„ „ not whitish-edged . . 50. *scotinella.*
57. Forewings with black mark along base of costa 58.
„ without such mark . . . 59.
58. Forewings with black costal spot at $\frac{2}{3}$ 52. *rhombella.*
„ without such spot . 51. *hippophaella.*
59. Terminal joint of palpi longer than second 12. *terrella.*
„ „ „ not longer than second . 60.
60. Forewings pale brownish . . . 60. *malvella.*
„ rather dark brown . . . 61.
61. Forewings paler-sprinkled, more pointed 13. *acuminatella.*
„ not paler-sprinkled . . . 62.
62. Pale posterior fascia whitish . . 56. *velocella.*
„ „ ochreous . . . 63.
63. Costa dark-spotted, stigmata usually whitish-edged . . . 54. *distinctella.*
„ not dark-spotted, stigmata edged with pale ochreous . . 61. *lentiginosella.*

1. **G. basaltinella,** *Z.* 11-12 mm. Head fuscous. Terminal joint of palpi longer than second. Forewings fuscous, mixed with pale greyish-ochreous in disc; small black spots on base of costa and dorsum, and one in disc near base; stigmata black, first discal above plical; a nearly straight pale fascia at $\frac{3}{4}$, often interrupted. Hindwings 1, grey.

S. England to Cambridge and Warwick, very local; C. Europe; 6, 7. Larva on moss; 3, 4. This and the next species frequent old thatches. Possibly this is only a form of the following species.

2. **G. domestica,** *Hw.* 12-13 mm. Head pale whitish-ochreous, sprinkled with fuscous. Terminal joint of palpi longer than second. Forewings whitish-ochreous, irrorated with fuscous; small black spots on base of costa and dorsum, and one in disc near base; stigmata black, first discal above plical; a somewhat angulated pale fascia at $\frac{3}{4}$, preceded by a blackish costal spot. Hindwings 1, pale grey.

England, E. Ireland, common; Germany, Syria; 7, 8. Larva reddish-brown, paler on each side of dorsal line, sides marbled with paler; spots black, conspicuous; head and plate of 2 blackish: on moss on walls; 2-4.

3. **G. umbrosella,** *Z.* 9-11 mm. Terminal joint of palpi as long as second, or somewhat longer. Forewings dark fuscous, slightly purplish-tinged; stigmata black, each sometimes followed by whitish scales, first discal beyond plical; a small white spot on tornus, and another on costa opposite. Hindwings 1, light grey.

England to York, on sandhills, local; C. Europe; 6, 7.

4. **G. affinis**, *Dgl.* (*confinis*, Stt.) 11-12 mm. Terminal joint of palpi longer than second. Forewings dark fuscous, sprinkled with whitish; a yellow-whitish basal dot; usually a small black spot in disc towards base; stigmata black, plical followed and two discal connected by yellow-whitish scales; a fine obtusely angulated sometimes interrupted yellowish-white fascia at ¾. Hindwings 1, light grey.

Britain to Perth, common; C. Europe; 6, 7. Larva pinkish, paler on each side of dorsal line, darker-marbled on sides; dots black, very inconspicuous; head and plate of 2 black: on moss on walls; 1-4. Stainton's *confinis* seems to be a dark northern form.

5. **G. similis**, *Stt.* 12-13 mm. Terminal joint of palpi longer than second. Forewings dark fuscous, somewhat paler-sprinkled; stigmata indistinctly blackish, first discal beyond plical; a faint slender obtusely angulated pale fascia at ¾, forming an indistinct ochreous-whitish spot on costa. Hindwings 1, grey, paler anteriorly.

England to Westmoreland, local and uncommon; Holland; 7.

6. **G. mundella**, *Dgl.* (*portlandicella*, Rich.) 10-11 mm. Terminal joint of palpi longer than second. Forewings pale greyish-ochreous, sometimes mixed with dark fuscous, especially towards dorsum and termen; a slender basal sometimes interrupted black fascia; a black discal spot beyond this; stigmata black, first discal beyond plical; in dark specimens a pale sometimes interrupted fascia at ¾, otherwise imperceptible. Hindwings 1, light grey.

Dorset, Devon, Norfolk, N. England, E. Ireland, on coast sandhills, local; Germany; 5, 6.

7. **G. obscurella**, *Hein.* 11-12 mm. Terminal joint of palpi longer than second. Forewings rather dark fuscous; a black discal spot towards base; stigmata black, first discal beyond plical. Hindwings 1, grey.

Kent, Suffolk, Westmoreland, Durham, very local; Germany; 6, 7.

8. **G. senectella**, *Z.* 10-11 mm. Terminal joint of palpi longer than second. Forewings light ochreous, mixed with fuscous, or wholly fuscous; a dark fuscous spot in disc near base; stigmata dark fuscous, first discal beyond plical; an

indistinct angulated pale fascia at $\frac{3}{4}$, preceded by a dark costal spot. Hindwings 1, light grey.

England to Westmoreland, E. Ireland, local; N. and C. Europe; 7.

9. **G. desertella**, *Dgl.* 12-13 mm. Terminal joint of palpi longer than second. Forewings light brownish-ochreous, often brownish-sprinkled; a blackish discal dot towards base; stigmata black, first discal beyond plical; sometimes some terminal blackish dots. Hindwings 1, pale grey.

England, E. Ireland, on sandhills, common; Germany; 6, 7.

10. **G. politella**, *Stt.* (*expolitella*, Dbld.) 13-15 mm. Terminal joint of palpi longer than second. Forewings light brownish-ochreous or brownish; stigmata in ♂ dark fuscous, indistinct, in ♀ black, distinct, first discal beyond plical; sometimes some terminal black dots. Hindwings 1, pale grey.

Suffolk and Wilts to the Clyde, N. and E. Ireland, in dry places, local; not recorded elsewhere; 6.

11. **G. figulella**, *Stgr.* 13-14 mm. Terminal joint of palpi longer than second. Forewings relatively broader than in *G. terrella*, fuscous, slightly reddish-tinged, darker-sprinkled towards fold; stigmata blackish, rather indistinct, first discal beyond plical; an indistinct paler angulated fascia at $\frac{3}{4}$; some black scales towards apex. Hindwings 1, pale grey.

Suffolk, on coast, local; S. France, Spain; 7. Larva whitish-ochreous; dorsal line reddish-ochreous; subdorsal dark brown; head pale brown; 2 with dark brown lateral mark: food-plant unknown, probably a grass; 5?

12. **G. terrella**, *Hb.* 14-16 mm. Terminal joint of palpi longer than second. Forewings brownish-ochreous to dark brown; stigmata blackish, first discal beyond plical; an indistinct pale angulated fascia at $\frac{3}{4}$; sometimes some dark terminal dots. Hindwings slightly over 1, light grey.

Britain to Caledonian Canal, Ireland, very common; Europe, Asia Minor; 6, 7. Larva greenish-grey; dorsal and subdorsal lines indistinctly darker; dots black; head black; 2 yellowish, with two black spots: on grass-stems, in silken gallery at their base; 3, 4.

13. **G. acuminatella**, *Sirc.* (? *gracilella*, Stt.) 12-14 mm. Terminal joint of palpi shorter than second. Forewings pointed, especially in ♀, rather dark fuscous, paler-sprinkled, often ochreous-mixed in disc, sometimes with a few blackish scales posteriorly; stigmata darker, indistinct, first discal

beyond plical; traces of pale fascia at $\frac{3}{4}$ faintly perceptible. Hindwings over 1, light grey, sometimes darker posteriorly.

England, rather common; C. Europe, Asia Minor; 5, 6, 8. Larva grey-greenish; dots black; head brown; 2 pale brown, with two blackish spots: in brownish blotches in leaves of *Carduus* and *Centaurea*; 7, 9.

14. **G. artemisiella**, *Tr.* 10-11 mm. Terminal joint of palpi as long as second or hardly longer. Forewings dark brown, whitish-sprinkled, more or less streaked longitudinally with ferruginous, dorsal area usually lighter; stigmata somewhat elongate, black, first discal rather beyond plical; usually a black mark on fold beyond plical; some black dots before apex and on termen. Hindwings 1, light grey, darker terminally.

England to York, E. Ireland, rather common; C. Europe; 6, 7. Larva greenish; dorsal and subdorsal lines darker; head pale brown; 2 brown-marked: in spun shoots of *Thymus*; 5, 6.

15. **G. atriplicella**, *F.R.* 13-15 mm. Terminal joint of palpi as long as second. Forewings dark fuscous, whitish-sprinkled, mixed or somewhat streaked longitudinally with pale ochreous, dorsal area lighter; a dark spot on costa at $\frac{1}{4}$; stigmata blackish, ill-defined, first discal rather beyond plical; indistinct blackish spots on fold before and beyond plical, and in angle of a faint pale fascia at $\frac{3}{4}$. Hindwings 1, light grey, darker terminally.

England to York, local; C. Europe; 7, 8. Larva greenish-yellow or green; dorsal line rosy-suffused; head yellowish: amongst spun leaves, flowers, and seeds of *Atriplex* and *Chenopodium*; 5, 6.

16. **G. obsoletella**, *F.R.* 12-13 mm. Terminal joint of palpi as long as second. Forewings pale greyish-ochreous, sprinkled with dark fuscous and ochreous-whitish; stigmata dark fuscous, first discal rather beyond plical; a dark fuscous spot close beyond and slightly beneath second discal, sometimes confluent with it; an indistinct fine pale angulated fascia at $\frac{3}{4}$, sometimes obsolete. Hindwings 1, whitish-grey, terminally darker.

England to York, especially on coasts, local; C. Europe, N. Africa; 5-9. Larva pale yellowish-green; dorsal line reddish; sides sometimes rosy-tinged; dots blackish-grey; head pale brownish-ochreous; plate of 2 blackish-brown: in stems of *Atriplex* and *Chenopodium*; 6-10.

17. **G. plantaginella**, *Stt.* 13-15 mm. Head grey, face whitish. Terminal joint of palpi as long as second. Forewings brown; veins and costa grey-whitish, suffusedly irrorated with

dark fuscous; dorsum sometimes lighter; stigmata blackish, indistinct, first discal beyond plical; sometimes dark costal spots near base, or a dark central longitudinal suffusion; faint costal and tornal whitish spots at $\frac{3}{4}$, sometimes obsolete; blackish terminal spots between veins. Hindwings 1, pale grey.

Britain to the Shetlands, E. Ireland, on coasts, common; not recorded elsewhere; 6, 7, 9. Larva dull yellowish; dorsal, subdorsal, and spiracular lines sometimes faintly pinkish; dots black; head brown; plate of 2 black: in roots and in blotches in leaves of *Plantago coronopus* and *P. maritima;* 4, 5, 7, 8.

18. **G. instabilella,** *Dgl.* 12-14 mm. Head ochreous-grey, face whitish. Terminal joint of palpi as long as second. Forewings brown, irrorated with darker and paler, partly ochreous-tinged; towards base two indistinct blackish spots on costa and two on fold; stigmata black, first discal beyond plical, second followed by a black spot, and another on fold beyond plical; sometimes a blackish longitudinal discal suffusion; a pale greyish-ochreous angulated fascia at $\frac{3}{4}$. Hindwings 1, light grey.

England, in salt-marshes, local; not confirmed as occurring elsewhere; 6, 7. Larva pale yellowish-green; dorsal, subdorsal, and faint spiracular lines brown-reddish; dots blackish; head and plate of 2 somewhat darker: in blotches in leaves of *Atriplex portulacoides;* 3-5.

19. **G. salicorniae,** *Hering.* 12-15 mm. Head pale greyish-ochreous. Terminal joint of palpi as long as second. Forewings pale greyish-ochreous to fuscous, paler-marbled, sometimes partly ferruginous-tinged; two bars or spots on costa and one on fold towards base, and large stigmata ferruginous-brown to dark fuscous, first discal beyond plical; a tolerably defined pale angulated fascia at $\frac{3}{4}$; usually a dark apical spot. Hindwings 1, grey.

England to Durham, on coasts, local; Germany; 6-9. Larva dull greenish; dorsal line red; subdorsal area often reddish; head and plate of 2 pale brown to blackish: in or among leaves of *Salicornia*, *Aster*, *Suaeda*, *Spergularia;* 5-8.

20. **G. suaedella,** *Rich.* 12-15 mm. Head ochreous-whitish, crown sometimes grey. Terminal joint of palpi as long as second. Forewings ochreous, veins suffusedly whitish-grey irrorated with dark grey; dorsal area distinctly pale; towards base two black spots on costa and two on fold; stigmata black, first discal beyond plical; a black spot beyond second discal,

and another on fold beyond plical; black terminal spots between veins. Hindwings 1, whitish-grey, darker terminally.

Sussex to Dorset and Norfolk, in salt-marshes, local; not recorded elsewhere; 7. Larva pale dull green; dorsal, subdorsal, and spiracular lines red-brown; dots dark red-brown; head and plate of 2 black: in silken gallery amongst leaves of *Suaeda fruticosa;* 5.

21. **G. ocellatella**, *Boyd.* 10-12 mm. Head rosy-whitish, crown sometimes greyish. Terminal joint of palpi shorter than second. Forewings ochreous, sometimes greyish-tinged or rosy-suffused, suffusedly irrorated with blackish-grey on disc, four costal patches, and an apical patch; stigmata black, sometimes ringed with pale, first discal beyond plical; an ill-defined nearly straight pale fascia at $\frac{3}{4}$; black terminal dots. Hindwings 1, whitish-grey.

Kent to Cornwall, Pembroke, on coasts, local; Germany, Madeira; 6, 8. Larva pale yellowish-green; each segment with a transverse series of irregular crimson blotches; dots blackish; head pale brown; plate of 2 pale brown, with some black marks: amongst buds or in leaves or stems of *Beta maritima;* 5, 7.

22. **G. Huebneri**, *Hw.* 12-13 mm. Head white, mixed with grey. Terminal joint of palpi as long as second. Forewings white, sprinkled with fuscous and irregularly mixed with ochreous-brownish; a black costal spot beyond $\frac{1}{4}$, and a dot beneath it below fold; stigmata black, plical elongate, first discal minute, second forming an angulated mark; a fine indistinct acutely angulated fascia at $\frac{3}{4}$; sometimes apex and termen black-mixed. Hindwings 1, grey.

Derby to Caledonian Canal, local and uncommon; Holland, Germany; 7, 8. Larva pale green; head and plate of 2 black: in spun shoots of *Stellaria holostea* and *S. uliginosa;* 5.

23. **G. knaggsiella**, *Stt.* 10-11 mm. Differs from *G. Huebneri* as follows: forewings irrorated with dark fuscous, white fascia distinct, obtusely angulated, first discal stigma larger.

Surrey, local; Germany; 7, 8. Larva in spun shoots and seed-capsules of *Stellaria holostea;* 5, 6.

24. **G. maculea**, *Hw.* 11-13 mm. Head white. Terminal joint of palpi shorter than second. Forewings white, more or less sprinkled with ochreous; some black scales towards base and apex; stigmata black, two anterior confluent with a broad oblique black bar from costa to fold, second discal forming an

angulated mark; a clear white obtusely angulated fascia at $\frac{3}{4}$, preceded by an ochreous suffusion. Hindwings 1, grey.

England, E. Ireland, common; C. Europe; 7, 8. Larva pale yellow-green; dots black; head and plate of 2 black: in spun shoots and seed-capsules of *Stellaria holostea;* 4-6.

25. **G. blandulella,** *Tutt.* 8-10 mm. Differs from *G. maculea* as follows: forewings clearer white, black bar narrower, less oblique, hence tending not to coalesce with first discal stigma, posterior discal angulated mark often separated into two spots, suffusion before fascia more fuscous; hindwings light grey.

Kent, on sandhills, local; not recorded elsewhere; 7, 8.

26. **G. fraternella,** *Dgl.* 10-11 mm. Head reddish-fuscous, whitish-mixed. Terminal joint of palpi as long as second. Forewings reddish-brown, somewhat whitish-sprinkled, edges blackish-mixed; black basal and subbasal spots in middle; stigmata black, two anterior confluent with a dark black-mixed oblique bar from costa, second discal connected with a blackish tornal spot; a white tornal spot following this, and another on costa slightly beyond it. Hindwings 1, grey.

England, E. Ireland, local; not recorded elsewhere; 6, 7. Larva dull greenish-brown, segmental incisions paler; dots black; head and plate of 2 black: in shoots of *Stellaria uliginosa* and *Cerastium triviale;* 4, 5.

27. **G. viscariella,** *Stt.* 11-12 mm. Head dark fuscous, mixed with whitish-fuscous. Terminal joint of palpi shorter than second. Forewings deep ochreous-brown, much mixed with dark fuscous; a dark spot on fold near base; stigmata black, indistinct, plical separating two obscure paler triangular dorsal blotches; a slightly angulated sometimes interrupted whitish-ochreous fascia at $\frac{3}{4}$. Hindwings 1, grey.

York to the Clyde, local; Hungary (?); 6, 7. Larva dull green; dorsal line darker; head black; 2 reddish-grey, plate black, bisected: in spun shoots of *Lychnis viscaria* and *L. dioica;* 4, 5.

28. **G. tricolorella,** *Hw.* 12-13 mm. Head dark fuscous, face whitish-suffused. Terminal joint of palpi almost as long as second. Forewings ferruginous-brown, costa and termen suffused with blackish; a white rather oblique fascia at $\frac{1}{4}$, followed by a triangular black costal blotch; a white irroration in middle of disc; second discal stigma black; an angulated white fascia at $\frac{3}{4}$, sometimes interrupted to form two spots, costal larger and rather posterior. Hindwings 1, light grey.

England, N. and E. Ireland, common; C. Europe; 6-8.

Larva whitish; dorsal, subdorsal, and lateral lines dull pink; head and plate of 2 black: in spun shoots of *Stellaria holostea;* 12-4.

29. **G. costella,** *Westw.* 13-14 mm. Head ochreous, sometimes grey-sprinkled. Terminal joint of palpi shorter than second. Forewings reddish-ochreous, sometimes suffusedly irrorated with dark fuscous; a dark fuscous triangular costal blotch extending from $\frac{1}{4}$ to $\frac{2}{3}$ and reaching fold, including the black stigmata, first discal followed by another black dot obliquely beneath it; an indistinct pale angulated fascia at $\frac{3}{4}$; often a dark fuscous terminal suffusion. Hindwings 1, grey.

England to York, local; Holland; 9-6. Larva greyish-green; dorsal and subdorsal lines sometimes darker; 2 and 3 dark purplish-brown; head and plate of 2 black: in blotches in leaves, or between spun leaves, or in berries or stem of *Solanum dulcamara;* 8, 9.

30. **G. maculiferella,** *Dgl.* 10-11 mm. Head dark fuscous, face ochreous-whitish. Terminal joint of palpi shorter than second. Forewings ochreous-brownish, slightly reddish-tinged, more or less irrorated with dark fuscous, especially towards margins; three or four indistinct darker spots towards base; stigmata black, two anterior confluent with a broad black oblique bar from costa, second discal forming an angulated mark; an obtusely angulated more or less interrupted whitish fascia at $\frac{3}{4}$. Hindwings 1, grey.

England to York, local; C. and S. Europe; 7.

31. **G. semidecandrella,** *Stt.* 10-11 mm. Differs from *G. maculiferella* as follows: forewings somewhat narrower, a distinctly marked black dot in disc before costal bar, posterior fascia not angulated, forming two direct opposite spots.

Britain to the Clyde, on coasts, local; Germany; 6, 7. Larva pale yellowish; head black; 2 red-brown, plate black: on flowers and seeds of *Cerastium triviale,* var. *semidecandrum;* 5.

32. **G. junctella,** *Dgl.* 10-11 mm. Head bronzy-grey, face pale. Terminal joint of palpi shorter than second. Forewings whitish, much irrorated with pale rosy-brownish and dark fuscous, especially towards margins; a blackish discal spot near base; two anterior stigmata confluent with a black oblique bar from costa, narrowed upwards; second discal black, forming a bent mark, followed by a pale reddish-brown blotch; a clear nearly straight whitish fascia at $\frac{3}{4}$, sometimes interrupted. Hindwings 1, light grey.

Essex, Hereford, York to Caledonian Canal, local; Germany; 8-4.

33. **G. marmorea**, *Hw.* 10-11 mm. Head light grey, face whitish. Terminal joint of palpi shorter than second. Forewings ochreous-brown, costa mixed with dark fuscous and sometimes whitish, dorsum broadly paler and sometimes whitish-mixed, connected with two pale or sometimes whitish spots before and beyond anterior stigmata, tornus and termen blackish-mixed; a blackish discal spot towards base; stigmata blackish, usually suffused and indistinct; a straight whitish interrupted fascia at $\frac{4}{5}$. Hindwings 1, pale grey, darker terminally.

England to York, Ireland, on sandy coasts, common; C. Europe; 6-8. Larva yellowish-grey-green; dorsal and subdorsal lines dull reddish; head and plate of 2 black: in a tube beneath sand, on trailing leaves of *Cerastium triviale;* 3-4.

34. **G. vicinella**, *Dgl.* 11-13 mm. Head grey, face whitish. Terminal joint of palpi shorter than second. Forewings fuscous, darker-sprinkled; a whitish suffusion along dorsum, near base extending indistinctly to costa, and prominent upwards in middle of disc, where it is also sometimes connected with costa; stigmata black, second discal often large; a nearly straight rather broad white interrupted fascia at $\frac{3}{4}$. Hindwings 1, grey.

Sussex, Suffolk, Hunts, I. of Man, N. Ireland, on coasts, local; C. Europe; 8, 9. Larva in spun shoots of *Silene maritima;* 5.

35. **G. leucomelanella**, *Z.* 11-13 mm. Head dark fuscous, face whitish. Terminal joint of palpi shorter than second. Forewings dark fuscous, with a few whitish scales; a white oblique fascia towards base, not reaching costa, connected with a pale or whitish streak along dorsum; sometimes a whitish suffusion in middle of disc; stigmata black, indistinct; a straight interrupted white fascia at $\frac{3}{4}$. Hindwings 1, light grey.

SW. England to Dorset and Pembroke, I. of Man, E. Ireland, on coasts, local; NC. Europe; 7. Larva green; head black; 2 red-brown, plate black, bisected: in spun shoots of *Silene maritima;* 5.

36. **G. luculella**, *Hb.* 10-12 mm. Head white, mixed with black. Terminal joint of palpi shorter than second. Forewings dark grey, mixed with black; some indistinct whitish spots towards base; a semicircular white costal blotch before middle, enclosing a blackish costal mark, and posteriorly suffused with yellow-ochreous in disc; a small whitish tornal

spot, and a larger one on costa opposite. Hindwings under 1, grey.

England to York, common; C. Europe; 5, 6. Larva whitish-green; dots black; head yellow-brown; plate of 2 yellow-brown, black-marked: between joined or beneath spun leaves of oak; 9.

37. **G. scriptella,** *Hb.* 12-13 mm. Head white. Terminal joint of palpi as long as second. Forewings whitish, irregularly mixed with ochreous or light brownish; black costal marks at base and before middle, and a larger spot beyond middle; dorsal $\frac{2}{3}$ much clouded with fuscous from near base to tornus; stigmata black, raised, plical placed in a streak on fold, first discal forming an oblique mark, second a transverse mark. Hindwings 1, grey.

Britain to Perth, local; C. and S. Europe, Asia Minor; 6. Larva dull whitish-green; dots black; head yellowish; 2 yellowish, black-margined and with two black spots: in folded leaves of maple; 8, 9.

38. **G. fugitivella,** *Z.* 12-13 mm. Head whitish, grey-sprinkled. Terminal joint of palpi longer than second. Forewings grey, irrorated with blackish; suffused blackish spots on costa near base and before and beyond middle; a blackish streak along fold, sometimes interrupted into two or three spots; two black dots transversely placed in disc at $\frac{2}{3}$; a pale angulated fascia at $\frac{3}{4}$ sometimes indicated by darker anterior suffusion. Hindwings 1, grey.

England, common; C. and SW. Europe; 6, 7. Larva light green, above reddish-tinged; dots black; head and plate of 2 light brown: on elm; 5.

39. **G. proximella,** *Hb.* 13-16 mm. Head whitish. Terminal joint of palpi shorter than second. Forewings whitish, irrorated with grey, with a few black scales; fine black marks on costa near base and before and beyond middle; two or three black dots or dashes towards base, and one beneath costa at $\frac{1}{3}$; stigmata black, first discal beyond plical, preceded by a sometimes confluent black dot, another black dot beneath second discal, and a discal dash beyond it; fuscous costal and tornal spots at $\frac{2}{3}$. Hindwings 1, grey.

Britain to the Orkneys, N. and W. Ireland, common; C. Europe; 5, 6. Larva pale green; dots black; head yellowish: in rolled or spun leaves of birch; 8, 9.

40. **G. notatella,** *Hb.* 12-15 mm. Head whitish, grey-sprinkled. Terminal joint of palpi as long as second. Fore-

wings whitish-grey, brownish-tinged in disc, suffusedly irrorated with dark grey, with a few black scales; darker spots on costa near base and before and beyond middle, and on tornus; a black dot at base of dorsum, and two in disc rather near base; stigmata black, first discal beyond plical, preceded by a black dot, another black dot beneath second discal. Hindwings 1, grey.

Britain to Perth, common; N. and C. Europe; 5, 6. Larva pale grey-greenish; head black; plate of 2 black posteriorly: between spun leaves of *Salix;* 8, 9.

41. **G. triparella**, *Z.* 11-13 mm. Head whitish-ochreous. Terminal joint of palpi shorter than second. Forewings whitish-ochreous, partly suffused with pale brownish-ochreous; usually some black scales on a basal dot, two or three costal marks, and round termen in cilia; two black dots transversely placed in disc at $\frac{1}{4}$; stigmata black, first discal above plical, another black dot below second discal. Hindwings 1, light grey.

England to York, S. Ireland, rather common; C. and S. Europe, Asia Minor; 5, 6. Larva yellowish-green; dots black; head pale brown: between joined leaves of oak; 8, 9.

42. **G. dodecella**, *L.* 11-13 mm. Head grey, face whitish. Terminal joint of palpi as long as second. Forewings whitish, densely irrorated with dark fuscous, appearing grey; indistinct broad darker fasciae at $\frac{1}{3}$ and $\frac{2}{3}$; a black basal dot, and a dash beneath costa at $\frac{1}{4}$; two black dots transversely placed in disc at $\frac{1}{4}$; stigmata black, first discal above plical, another black dot below second discal; a fine indistinct whitish interrupted fascia at $\frac{3}{4}$: on undersurface a longitudinal patch of thinly set erect scales in disc. Hindwings 1, grey.

England to Durham, common; C. Europe; 6, 7. Larva brownish-fleshcolour; dots black; head black-brown: in shoots and between needles of *Pinus sylvestris;* 5.

43. **G. vulgella**, *Hb.* 11-13 mm. Head grey, face whitish. Terminal joint of palpi as long as second. Forewings grey, irrorated with darker and some black scales; indistinct blackish spots on costa near base and before and beyond middle; sometimes two black dots transversely placed in disc at $\frac{1}{4}$; stigmata black, first discal above plical, second confluent with a blackish bar of raised scales from tornus. Hindwings 1, rather dark grey.

England to York, E. Ireland, common; C. Europe; 6, 7. Larva greenish-grey; dots black; head ochreous-brown; plate of 2 black, bisected: between spun leaves of hawthorn and blackthorn; 4, 5.

44. **G. sequax**, *Hw.* 12-14 mm. Head white, crown grey-sprinkled. Terminal joint of palpi almost as long as second. Forewings whitish, densely irrorated with fuscous and dark fuscous; an oblique white fascia beyond $\frac{1}{4}$, anterior edge indented and blackish-margined; stigmata blackish, first discal above plical; a cloudy whitish fascia at $\frac{3}{4}$; a blackish discal dash beyond this, and a blackish apical dash, sometimes confluent. Hindwings 1, light grey.

Britain to the Clyde, N. Ireland, rather common; C. Europe, N. America; 7. Larva whitish, tinged with dull greenish; dots grey; head and plate of 2 brown: in spun shoots of *Helianthemum;* 5, 6.

45. **G. nigra**, *Hw.* (*cautella*, Z.) 15-17 mm. Terminal joint of palpi shorter than second. Forewings dark fuscous, irrorated with white and black; an indistinct darker oblique streak from costa near base, and costal spots before and beyond middle; stigmata blackish, first discal above plical, a blackish longitudinal mark between first and second discal; an indistinct whitish angulated fascia at $\frac{3}{4}$. Hindwings over 1, grey.

Kent to Norfolk, Hereford, Northumberland, local; C. Europe; 6, 7. Larva green; head brown: between joined leaves of *Populus alba* and *P. tremula;* 5, 6.

46. **G. muscosella**, *Z.* 14-16 mm. Terminal joint of palpi longer than second. Abdomen with three basal segments ochreous-yellowish. Forewings fuscous, sprinkled with whitish and black; indistinct oblique dark fuscous marks from costa near base, at $\frac{1}{4}$, and beyond middle; stigmata black, first and sometimes second discal white-ringed, connected by a black streak, plical included in a black streak on fold interrupted by a whitish dot; an indistinct pale angulated fascia at $\frac{3}{4}$. Hindwings over 1, light fuscous.

Norfolk, Cambridge, local; C. Europe; 6, 7. Larva in rolled leaves of poplar and *Salix;* 5.

47. **G. cuneatella**, *Dgl.* 15-17 mm. Second joint of palpi almost tufted beneath, terminal longer. Abdomen with three basal segments ochreous-yellowish. Forewings narrow, ochreous-grey, irrorated with white and black; a blackish mark on base of costa and blackish spots before and beyond middle; blackish spots in disc near base, beyond $\frac{1}{4}$, and about middle; two or three black dashes on fold; a slender angulated whitish fascia at $\frac{3}{4}$; some blackish interneural streaks posteriorly. Hindwings over 1, light grey, darker terminally.

Middlesex, York, local; Germany; 9. Larva on *Salix;* 7.

48. **G. pinguinella,** *Tr.* 19-22 mm. Terminal joint of palpi shorter than second. Abdomen with three basal segments ochreous-yellowish. Forewings rather dark fuscous, irrorated with pale whitish-ochreous; darker spots on costa near base and before and beyond middle; stigmata dark fuscous, first discal elongate, before plical, between first and second discal an elongate dark fuscous mark connected with each by whitish-ochreous spots; a whitish-ochreous angulated fascia at $\frac{3}{4}$. Hindwings slightly over 1, fuscous-grey.

Middlesex to Cambridge, local; C. Europe; 7. Larva pale green; dorsal and subdorsal lines paler; head black; 2 with two black marks: between joined leaves of *Populus nigra;* 5.

49. **G. sororculella,** *Hb.* 15-16 mm. Terminal joint of palpi almost as long as second. Forewings rather dark fuscous, more or less whitish-sprinkled, paler dorsally, between veins blackish-mixed; a white dot in disc at $\frac{1}{4}$; stigmata black, first discal conspicuously white-ringed, other two partly white-edged, first and second discal connected by a blackish streak; a blackish interrupted streak along fold; a fine whitish angulated fascia at $\frac{3}{4}$; terminal blackish dots, partly whitish-edged. Hindwings over 1, grey.

England to York, common; C. Europe; 7. Larva whitish-green; dorsal and lateral lines broad, brown; head brown: in spun shoots of *Salix;* 5, 6.

50. **G. scotinella,** *HS.* 12-15 mm. Terminal joint of palpi shorter than second. Forewings greyish-ochreous, violet-tinged, coarsely irrorated with dark fuscous; an oblique sometimes nearly obsolete dark fuscous mark from base of costa; stigmata blackish, first discal large, beyond plical, second forming a transverse sometimes bent mark, connected with first by a pale mark, plical sometimes obsolete; a pale often faint somewhat bent fascia at $\frac{3}{4}$, preceded by darker suffusion. Hindwings somewhat over 1, light grey.

England to Lancashire, local and uncommon; Germany, Switzerland; 6, 7. Larva in spun shoots of blackthorn; 4.

51. **G. hippophaëlla,** *Schrk.* 17-18 mm. Terminal joint of palpi almost as long as second. Forewings pale greyish-ochreous, brownish-sprinkled; a black mark along base of costa; stigmata blackish, often indistinct; a faint paler angulated fascia at $\frac{3}{4}$; usually blackish terminal dots. Hindwings over 1, light grey.

Kent, local; Germany, Switzerland; 8, 9. Larva pale greenish or yellowish; dorsal and subdorsal lines indistinctly pale; spots black; head pale greenish-brown: in spun shoots of *Hippophae rhamnoides*; 7.

52. **G. rhombella**, *Schiff.* 13-14 mm. Terminal joint of palpi as long as second. Forewings pale ochreous to light fuscous, sprinkled with black; a black spot along costa at base, and another at $\frac{2}{3}$; stigmata black, plical minute, second discal usually forming a bent mark; a dark tornal spot; sometimes a faint pale angulated fascia at $\frac{3}{4}$; usually blackish terminal spots. Hindwings somewhat over 1, pale grey, darker terminally.

England to Durham, E. Ireland, local; C. Europe; 7. Larva dark green, sides reddish-tinged; subdorsal and spiracular lines whitish; head dark brown; plate of 2 black, bisected: between joined leaves of apple; 5, 6.

53. **G. solutella**, *Z.* 16-19 mm. Terminal joint of palpi somewhat longer than second. Forewings dark fuscous, more or less sprinkled with grey-whitish; a blackish oblique mark in disc towards base; stigmata rather large, blackish, first discal rather beyond plical; a pale angulated fascia at $\frac{3}{4}$, sometimes interrupted, often very indistinct. Hindwings over 1, light grey.

Cornwall, York, Durham, Perth, local; C. and S. Europe, Asia Minor; 5. Larva in galleries amongst *Genista*; 7.

54. **G. distinctella**, *Z.* (*celerella*, Stt.; *fumatella*, Dgl.) 12-17 mm. Terminal joint of palpi as long as second. Forewings brown, usually mixed with dark fuscous; usually indistinct dark fuscous spots on costa near base, at $\frac{1}{4}$, and beyond middle, and in disc near base and at $\frac{1}{4}$; stigmata black, often partly edged with whitish, first discal beyond plical; an indistinct pale ferruginous-tinged angulated fascia at $\frac{3}{4}$, sometimes almost obsolete. Hindwings over 1, light grey.

England to York, local; C. and S. Europe, Asia Minor; 7, 8. Stainton's *celerella* was described from small distinctly marked specimens. The supposed British record of *G. strelitziella*, HS., was founded on an example of this species.

55. **G. diffinis**, *Hw.* 14-16 mm. Terminal joint of palpi as long as second. Forewings ochreous-brownish, violet-tinged, more or less densely irrorated with blackish and whitish; an angulated oblique fascia of three violet-black raised marks about $\frac{1}{4}$; stigmata blackish, first discal slightly beyond plical, second forming a transverse mark or pair of dots; an indistinct

pale angulated fascia at $\frac{3}{4}$, preceded by dark costal and dorsal spots. Hindwings over 1, grey.

Britain to Perth, E. Ireland, rather common; Europe; 5, 6. Larva brownish-green, reddish-marbled; head and plate of 2 yellow-brown: in gallery along stems, amongst seeds, or in rootstock of *Rumex acetosella;* 8-4.

56. **G. velocella**, *Dup.* 12-15 mm. Terminal joint of palpi as long as second. Forewings dark brown, sometimes partly ferruginous-streaked, in disc and posteriorly between veins streaked with blackish; stigmata blackish, first discal beyond plical; a very faint whitish angulated fascia at $\frac{3}{4}$, sometimes obsolete except a more distinct white costal spot. Hindwings over 1, grey.

England to Westmoreland, local; N. and C. Europe, Asia Minor; 5, 8. Larva at base of stems of *Rumex acetosella;* 9-4, 6.

57. **G. peliella**, *Tr.* 13-15 mm. Terminal joint of palpi somewhat longer than second. Forewings dark fuscous, whitish-sprinkled; a blackish spot in disc near base; stigmata rather large, black, posteriorly white-edged, first discal above plical; a white tornal triangular spot, and another on costa opposite. Hindwings slightly over 1, grey.

Kent, Lancashire, local; C. and S. Europe; 7. Larva pale whitish-green; head and plate of 2 black: on *Rumex acetosella,* concealing itself in a gallery towards base of stem; 5.

58. **G. boreella**, *Dgl.* 13-15 mm. Terminal joint of palpi shorter than second. Forewings rather dark fuscous; stigmata blackish, first discal beyond plical, connected with second by a yellow-whitish streak, plical partly edged with yellow-whitish; an indistinct yellow-whitish angulated fascia at $\frac{3}{4}$; vein 6 out of 7. Hindwings slightly over 1, light grey.

Argyll to Sutherland, local; Germany, Finland; 6, 7.

59. **G. galbanella**, *Z.* 14-15 mm. Terminal joint of palpi shorter than second. Forewings fuscous, sprinkled with pale yellowish; stigmata black, first discal beyond plical; an indistinct pale yellowish angulated fascia at $\frac{3}{4}$. Hindwings 1, grey.

Perth, local; N. and C. Europe; 7.

60. **G. malvella**, *Hb.* 17-19 mm. Head and palpi whitish-ochreous; terminal joint of palpi as long as second. Forewings pale brownish, becoming fuscous posteriorly, with traces of darker strigulae, more distinct and blackish on costa; stigmata rather dark fuscous, first discal beyond plical, second sometimes

obsolete; a very indistinct suffused pale fascia at ¾. Hindwings over 1, light grey.

England to York, local; C. and S. Europe; 6, 7. Larva whitish-ochreous; spots reddish; head blackish: in seeds of *Althea rosea* and *A. officinalis;* 9, 10.

61. **G. lentiginosella**, *Z.* 13-16 mm. Terminal joint of palpi shorter than second. Forewings dark purplish-coppery-fuscous; stigmata darker, partly edged with light ochreous, first discal rather beyond plical; a pale coppery-ochreous costal spot at ¾, and sometimes a faint tornal spot opposite. Hindwings somewhat over 1, light grey.

England to Lancashire, common; C. Europe, Asia Minor; 7, 8. Larva yellowish-green; head and plate of 2 black: in spun shoots of *Genista tinctoria;* 5, 6.

62. **G. mulinella**, *Z.* 12-14 mm. Terminal joint of palpi as long as second. Forewings pale ochreous, more or less irrorated with dark fuscous, more strongly on margins, and sometimes with whitish; usually a broad cloudy blackish-fuscous streak along fold to before middle, connected with another in disc from ⅓ to apex; above these a pale subcostal streak; stigmata blackish, usually concealed in the dark streaks. Hindwings over 1, very pale grey.

England, E. Ireland, common; WC. and SW. Europe; 7, 8. Larva dull green; dots black; head black; plate of 2 black, with central white line: in flowers of *Ulex* and *Cytisus;* 4, 5.

63. **G. ericetella**, *Hb.* 15-17 mm. Terminal joint of palpi shorter than second. Forewings from pale fuscous-grey to dark fuscous, sometimes whitish-sprinkled; a blackish spot in disc at ¼; stigmata blackish, often elongate, partly white-margined, first discal beyond plical; distinct black terminal dots; a more or less marked dark tornal spot. Hindwings over 1, light grey.

Britain to the Shetlands, Ireland, very common; Europe, Asia Minor; 5, 6. Larva dull greenish; dorsal and subdorsal lines pale dull reddish; 3 and 4 with dark red subdorsal spots; head pale brown; 2 whitish-green, grey-speckled: amongst spun shoots of *Erica* and *Calluna;* 9-3.

64. **G. longicornis**, *Curt.* 14-15 mm. Terminal joint of palpi as long as second. Forewings dark reddish-brown, suffused with dark fuscous towards base and termen in disc; five fasciae of white irroration, first basal, produced along dorsum, second at ¼, curved, third central, fourth somewhat inwards-

curved, fifth slender, terminal; stigmata dark fuscous, first discal above plical. Hindwings slightly over 1, fuscous.

Hereford to Sutherland, common; N. and C. Europe, Asia Minor; 5, 6. Larva probably on *Empetrum nigrum;* 7?

13. TACHYPTILIA, *Hein.*

Labial palpi very long, second joint thickened with appressed scales, sometimes roughened above in middle, terminal longer than second. Abdomen somewhat flattened. Hindwings 1 or over 1, trapezoidal, termen not sinuate, cilia $\frac{2}{3}$-$\frac{4}{5}$; 3 and 4 connate, 5 parallel, 6 and 7 connate.

A small northern temperate genus, correlated with the preceding. Imago with forewings elongate, apex round-pointed, termen very oblique.

Forewings wholly blackish . . . 1. *temerella.*
,, not wholly blackish . . 2. *populella.*

1. **T. temerella**, *Z.* 10-12 mm. Forewings blackish, slightly violet-tinged; stigmata deep black, very indistinct, first discal beyond plical; a broad suffused black fascia at $\frac{2}{3}$. Hindwings 1, rather dark grey.

Cheshire to Westmoreland, local; N. Europe, Holland, N. Germany; 7. Larva whitish; dots black; head and plate of 2 black: in spun shoots of *Salix repens;* 6.

2. **T. populella**, *Cl.* 14-17 mm. Abdomen with segments 2-4 often ochreous-yellow. Forewings whitish, more or less irrorated with black or dark grey, usually palest towards base of costa; costal edge sometimes yellowish-tinged; sometimes a large black patch occupying dorsal $\frac{2}{3}$ from base to near tornus; stigmata blackish, often concealed; a whitish obtusely angulated fascia at $\frac{3}{4}$, indented above angle, sometimes indistinct; terminal black dots. Hindwings over 1, rather dark grey.

England to York, S. Ireland, common; Europe, N. Asia; 7-9. Larva pale grey-greenish or yellowish; dots black; head and plate of 2 black: in rolled leaves of poplar, *Salix*, and birch; 5, 6.

14. PSORICOPTERA, *Stt.*

Labial palpi very long, second joint beneath with rough projecting scales, furrowed, terminal longer than second, above with rough projecting scales except towards apex. Abdomen flattened. Forewings with slight scale-tufts in disc. Hindwings over 1, trapezoidal, termen subsinuate, cilia 1; 3 and 4 connate, 5 parallel, 6 and 7 closely approximated.

Contains only one species, correlated with the preceding. Imago with forewings elongate, pointed.

1. **P. gibbosella**, *Z.* 15-17 mm. Forewings brown, irregularly mixed with whitish and blackish; base of dorsum whitish, edged with a black streak; three transverse marks of raised blackish scales in disc, placed longitudinally, second connected with costa by an ill-defined oblique blackish bar; blackish costal spots before and beyond middle; a sharply angulated indistinct whitish fascia at $\frac{3}{4}$. Hindwings light grey, darker posteriorly.

England to Lancashire, local; C. Europe; 7. Larva grey; dorsal line slightly darker; subdorsal darker; dots black; head and plate of 2 black: in rolled leaves of oak; 5, 6.

15. PLATYEDRA, *n.g.*

Labial palpi very long, second joint thickened beneath with rough scales towards apex, terminal longer than second. Abdomen flattened. Hindwings over 1, trapezoidal, termen subsinuate, cilia $\frac{2}{3}$; 3 and 4 connate, 5 parallel, 6 and 7 connate.

Founded on the single species; also correlated with the preceding. Imago with forewings elongate, termen oblique.

1. **P. vilella**, *Z.* 14-18 mm. Forewings greyish-ochreous, sprinkled with fuscous; a blackish dot near base of dorsum; traces of a dark fuscous median longitudinal streak; first and second discal stigmata dark fuscous, usually faint or obsolete, sometimes indistinctly pale-ringed. Hindwings very pale grey.

Kent to Devon and Cambridge, local; W. Germany, S. Europe, WC. Asia to N. Persia, N. Africa; 8-5. Larva pinkish; spots large, brownish; head and plate of 2 black: in flowers and seeds of *Malva sylvestris*; 6, 7. The imago is fond of hiding in thatch.

16. BRACHMIA, *Hb.*

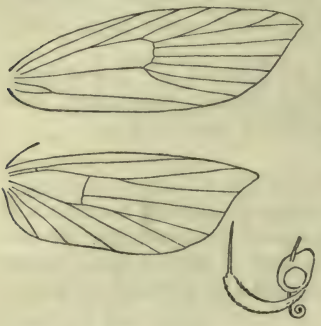
Second joint of labial palpi thickened with appressed scales, terminal shorter than second. Forewings: 2 and 3 stalked, 8 and 9 out of 7, 7 to apex. Hindwings 1, trapezoidal, apex pointed, termen subsinuate, cilia 1; 3 and 4 connate or stalked, 5 approximated, transverse vein sometimes absent between 5 and 6, 6 and 7 stalked.

A small genus, mainly European and Asiatic. Imago with forewings elongate, somewhat dilated posteriorly, termen oblique.

1. Termen of forewings subconcave, stigmata black . 2.
,, ,, straight, stigmata not black 2. *rufescens.*
2. Forewings with dark fasciae . . 1. *gerronella.*
,, without transverse markings . 3. *inornatella.*

1. **B. gerronella,** *Z.* 11-12 mm. Forewings with termen subconcave; ochreous, irrorated with brown; an indistinct darker angulated fascia at $\frac{1}{3}$; a more distinct oblique dark fuscous fascia beyond middle; stigmata black, first discal beyond plical; an indistinct dark spot on costa at $\frac{2}{3}$; a dark fuscous subterminal suffusion, preceded by an indistinct pale fascia. Hindwings light grey.

S. England to Norfolk and Pembroke, local; C. Europe, Syria; 7.



Neuration and head of *Brachmia rufescens.*

2. **B. rufescens,** *Hw.* 15-17 mm. Forewings with termen straight; light reddish-ochreous, sometimes darker between veins posteriorly; second discal stigma sometimes fuscous. Hindwings whitish-grey, tinged with reddish-ochreous.

England to York, E. Ireland, common; C. Europe; 7. Larva white; subdorsal line and lateral series of oblique marks dark grey; dots black; 3-6 black, 3 and 4 white-edged anteriorly, 6 with brown dorsal blotch; head and plate of 2 black: in rolled leaves of grasses (*Poa, Arrhenatherum,* etc.); 8-5.

3. **B. inornatella,** *Dgl.* 11-14 mm. Forewings with termen subconcave; light greyish-ochreous, sprinkled with fuscous; stigmata black, first discal beyond plical; a pale fascia at $\frac{4}{5}$ sometimes indicated. Hindwings grey.

Cambridge, in fens, local; Holland, N. Germany; 6.

17. Recurvaria, *Hw.*

Labial palpi very long, second joint thickened with appressed scales, terminal as long as second. Hindwings over 1, trapezoidal, apex rounded, termen sinuate, cilia $\frac{1}{2}$; 3 and 4 connate, 5 approximated, 6 and 7 connate or short-stalked.

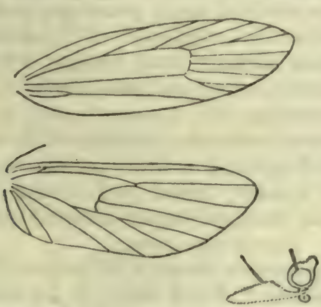
Includes only a very few species, inhabiting the European region. Imago with forewings elongate, somewhat dilated posteriorly, termen rather oblique.

1. **R. cinerella**, *Cl.* 17-19 mm. Forewings rather light greyish-brown; stigmata sometimes faintly darker. Hindwings grey.

England, N. and E. Ireland, amongst grass in woods, common; Europe; 6, 7.

18. YPSOLOPHUS, *F.*

Labial palpi very long, second joint with dense projecting tuft beneath, sometimes with rough scales above, terminal as long as or longer than second. Forewings: 2 and 3 sometimes stalked. Hindwings 1 or somewhat over 1, trapezoidal, termen hardly sinuate, cilia $\frac{1}{2}$-$\frac{3}{4}$; 3 and 4 connate or stalked, 5 somewhat approximated, 6 and 7 closely approximated or stalked.



Neuration and head of *Ypsolophus marginellus.*

A genus of moderate size but very general distribution, though absent from New Zealand. Imago with forewings elongate, usually more or less dilated posteriorly, termen oblique. Larva in a slight web or amongst spun leaves.

1. Forewings with white costal streak . . 2.
„ without white costal streak . . 4.
2. Forewings with white dorsal streak . 3. *marginellus.*
„ without white dorsal streak . . 3.
3. Forewings with oblique white opposite streaks . 1. *humerellus.*
„ without such streaks . 2. *semicostellus.*
4. Forewings grey . . . . 4. *juniperellus.*
„ not grey . . . . 5.

5. Forewings ochreous . . . . . 6.
„ ferruginous-brown . . . 7.
6. Forewings with blackish terminal dots . 5. *verbascellus.*
„ „ blackish terminal line . 6. *schmidiellus.*
7. Forewings with dark stigmata and fascia 7. *fasciellus.*
„ without dark markings . 8. *ustulellus.*

1. **Y. humerellus,** *Schiff.* 10-11 mm. Head white, crown grey-tinged. Forewings with apex produced; yellowish-brown, mixed with dark fuscous; a white costal streak from base to near middle, thence to disc beyond middle; two oblique white opposite streaks at $\frac{2}{3}$; between these a blackish dash; two short white inwardly oblique costal marks before apex; a white irroration towards termen; a blackish apical mark. Hindwings light grey.

Two specimens recorded many years ago, probably authentic, but locality unknown; C. Europe; 7. Larva green; dorsal and subdorsal lines darker; head brown; 2 blackish-marked: between spun leaves of *Artemisia campestris;* 5.

2. **Y. semicostellus,** *Hb.* (*parenthesella,* Hw.) 16-19 mm. Forewings ochreous-brownish, irrorated with dark grey, veins posteriorly whitish-mixed; a white costal streak from near base to beyond middle; plical and second discal stigmata elongate, blackish, beneath latter a round blackish spot; a black apical dot. Hindwings grey.

England to Lancashire, local; C. Europe; 6, 7.

3. **Y. marginellus,** *F.* 14-16 mm. Head white. Forewings golden-ochreous-brown; a white costal streak from base to near apex; a white dorsal streak from base to middle of termen; a dark terminal line. Hindwings whitish-grey.

Surrey, Wilts, Norfolk, Cambridge, Lancashire to Northumberland, local; C. Europe, N. Asia; 7, 8. Larva grey, sides ochreous; dorsal and subdorsal lines reddish-brown; head reddish-brown; plate of 2 brown-black: in a web on *Juniperus;* 5, 6.

4. **Y. juniperellus,** *L.* 16-21 mm. Forewings light grey, somewhat sprinkled with dark fuscous, especially before pale fascia; stigmata blackish, first discal beyond plical; an indistinct pale somewhat indented fascia before $\frac{3}{4}$; black terminal dots. Hindwings light grey.

Perth, Moray, local; C. Europe, Asia Minor; 7. Larva in a web on *Juniperus;* 4, 5.

5. **Y. verbascellus,** *Hb.* 16-21 mm. Forewings light ochreous, more or less black-sprinkled; a black dot on base of costa;

stigmata black, first discal often absent, plical small; terminal blackish dots. Hindwings grey.

Norfolk, very local; C. and SW. Europe, Asia Minor; 7. Larva brown; head and plate of 2 black: in a web on *Verbascum;* 9-5.

6. **Y. schmidiellus,** *Heyd.* (*durdhamellus,* Stt.) 13-15 mm. Forewings light reddish-ochreous; stigmata black, discal sometimes obsolete; an indistinct brownish subterminal fascia; a terminal blackish line. Hindwings light bluish-grey, slightly reddish-tinged.

S. England to Hereford and Norfolk, local; Germany; 7, 8. Larva yellow-whitish; dorsal and subdorsal lines deep purple-brown; head black; plate of 2 brown or blackish; 3 and 4 swollen, wholly dark purple-brown or blackish: in rolled leaves of *Origanum;* 6.

7. **Y. fasciellus,** *Hb.* 17-21 mm. Forewings ferruginous-brown, suffusedly darker-sprinkled; stigmata dark fuscous, indistinct; an angulated darker fascia about ⅔. Hindwings grey.

Kent to Worcester and Cambridge, local; C. and SE. Europe, Asia Minor; 5. Larva pale yellowish-grey; dorsal line greenish-grey; subdorsal faint; dots black; head reddish-ochreous; 2 pale ochreous, with four black spots: in rolled leaves of blackthorn; 9.

8. **Y. ustulellus,** *F.* 17-20 mm. Forewings dark ferruginous-brown, towards costa beyond middle broadly irrorated with pale yellow-ochreous. Hindwings dark fuscous.

Worcester, very local; C. and SE. Europe, Asia Minor; 5, 6. Larva dull yellowish-green; dorsal line darker; spots black; head dark brown; 2 brown, posterior halves of 2-4 blackish: between joined leaves of hazel, hornbeam, birch, *Salix;* 9, 10.

19. ANARSIA, *Z.*

Second joint of labial palpi with dense projecting tuft beneath, terminal in ♂ very short, concealed, in ♀ longer than second. Forewings: 6 usually out of 7 near base. Hindwings 1, trapezoidal, termen hardly sinuate, cilia 1; 3 and 4 connate or approximated, 5 rather approximated, 6 and 7 stalked.

Although including only a few closely allied species, this genus is distributed through all the principal regions except New Zealand. Imago with forewings elongate, pointed.

1. **A. spartiella,** *Schrk.* (*genistae,* Stt.) 12-15 mm. Fore-

wings grey-whitish, finely irrorated with fuscous, often with some black scales, occasionally much suffused with dark fuscous; several short oblique dark fuscous costal marks, one in middle largest; stigmata sometimes indicated by black dashes; often a black terminal spot below apex. Hindwings light grey.

England to York, E. Ireland, rather local; C. and S. Europe, Asia Minor; 7. Larva dark brown; head and plate of 2 black: in spun shoots of *Ulex*, *Cytisus*, and *Genista;* 5, 6. Stainton's *genistae* seems to be only a dark form of this species.

20. CHELARIA, *Hw.*

Labial palpi very long, second joint with rough projecting tuft beneath, terminal longer than second, with subapical projection of scales above. Forewings: 7 and 8 out of 6. Hindwings 1, elongate-trapezoidal, apex round-pointed, termen scarcely sinuate, cilia 1; 3 and 4 approximated, 5 rather approximated, 6 and 7 stalked.

Includes only the single species; correlated to the preceding. Imago with forewings elongate, narrow, pointed.

1. **C. huebnerella**, *Don.* (*conscriptella*, Hb.) 15-17 mm. Forewings whitish-grey, sometimes sprinkled with dark grey, margins sometimes ochreous-tinged; usually a dark fuscous suffusion near dorsum towards base; costa marked with small blackish spots except towards base; a triangular blackish partly brown-edged costal blotch before middle; a dark grey tornal spot; a black dash on termen below apex. Hindwings light grey.

England, Ireland, common; C. Europe; 8, 9. Larva pinkish-brown; head and plate of 2 black: in rolled leaves of birch; 6.

21. SYMMOCA, *Hb.*

Second joint of labial palpi with appressed scales, terminal as long as second. Hindwings 1 or under 1, elongate-ovate, cilia 1; 3 and 4 connate, 5 somewhat approximated, 6 and 7 stalked.

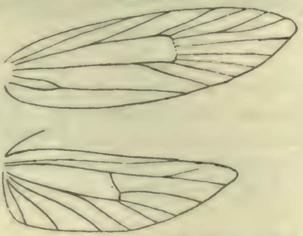
A rather small genus, mainly European; it is an early unspecialised form of the family. Imago with forewings elongate, termen oblique.

Forewings dark fuscous . .	2. *quadripuncta.*
„ pale greyish . . .	1. *signatella.*

1. **S. signatella**, *HS.* 13-15 mm. Forewings whitish, thinly

sprinkled with fuscous and black; a dark fuscous mark at base of costa; indistinct dark fuscous spots on costa before and beyond middle; stigmata blackish, first discal before plical, nearly connected with it, second confluent with a dark fuscous tornal spot; dark fuscous terminal dots. Hindwings 1, rather dark grey.

Has occurred lately in London near the Docks, not uncommonly, doubtless introduced, but perhaps establishing itself; S. Europe, but lately established in France (Paris); 7-9. Larva has been stated to feed on lichens.



Neuration of *Symmoca quadripuncta*.

2. **S. quadripuncta**, *Hw.* (*kindermanniella*, HS.) 12-16 mm. Forewings narrower, blackish-fuscous; extreme base, a spot or cloudy fascia near base, a moderately broad central fascia, and an irregular sometimes interrupted fascia at $\frac{3}{4}$ pale ochreous-yellowish. Hindwings pale grey.

S. England to Suffolk and Gloucester, E. Ireland, local; C. and S. Europe, WC. Asia to N. Persia; 7, 8.

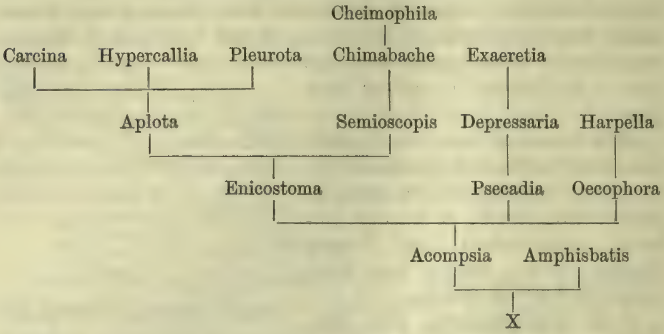
3. OECOPHORIDAE.

Head with appressed or sometimes loose scales, side-tufts often spreading. Basal joint of antennae usually with pecten. Labial palpi more or less long, curved, ascending, terminal joint acute. Maxillary palpi very short, appressed. Posterior tibiae rough-haired. Forewings: 1b furcate or rarely simple, 7 and 8 stalked, or rarely coincident. Hindwings 1 or less, ovate to lanceolate; all veins present, 3 and 4 connate or approximated, 5 parallel or sometimes approximated to 4, 6 and 7 remote, nearly parallel, 8 free.

This family is moderately numerous in all regions, but in Australia it is abnormally predominant, the number of known species from that region already exceeding 900, although the fauna is very incompletely explored. The structure is very constant throughout the family.

Larva more or less elongate, with 10 prolegs; feeding amongst spun leaves or seeds or in decayed wood, rarely mining in leaves. Pupa with segments 9-11 free; not protruded from cocoon in emergence.

Phylogeny of Oecophoridae.


Cheimophila
Carcina
Hypercallia
Pleurota
Chimabache
Exaeretia
Aplota
Semioscopis
Depressaria
Harpella
Enicostoma
Psecadia
Oecophora
Acompsia
Amphisbatis
X

Tabulation of Genera.

1. Forewings with 7 and 8 coincident . . 15. Amphisbatis.
„ „ „ stalked . . . . 2.
2. Forewings with 7 to termen . . . . 3.
„ „ 7 to costa or apex . . . 7.
3. Antennae over 1 . . . . 1. Carcina.
„ under 1 . . . . . 4.
4. Tongue obsolete . . . . 5. Cheimophila.
„ developed . . . . . 5.
5. Second joint of palpi with rough projecting hairs
above . 3. Pleurota.
„ „ „ not rough above . . 6.
6. Antennal ciliations of ♂ moderate (1) . 4. Aplota.
„ „ „ long (3) . 2. Hypercallia.
7. Tongue rudimentary; wings of ♀ incomplete
6. Chimabache.
„ developed; wings of ♀ fully developed . 8.
8. Abdomen strongly flattened . 10. Depressaria.
„ not flattened . . . . 9.
9. Antennae thickened with scales towards base
13. Oecophora.
„ not thickened with scales . . 10.
10. Antennal ciliations of ♂ very long (4) . 12. Harpella.
„ „ „ not long (2 or less) . 11.
11. Thorax crested . . . . 9. Exaeretia.
„ not crested . . . . . 12.
12. Forewings with scale-tufts on surface 8. Enicostoma.

Forewings without scale-tufts . . . 13.
13. Basal joint of antennae with pecten . 14. Acompsia.
„ „ „ without pecten . . 14.
14. Hindwings with 3 and 4 connate . . 11. Psecadia.
„ „ „ approximated 7. Semioscopis.

1. Carcina, *Hb.*

Tongue developed. Antennae over 1, in ♂ thick, simple, basal joint with pecten. Labial palpi moderately long, second joint with appressed scales, thickened towards apex, terminal rather short. Forewings: 2 widely remote, 3 and 4 stalked, 7 to termen. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$; 3 and 4 connate.

Only the single species is known. Imago with forewings suboblong, termen little oblique.

1. **C. quercana**, *F.* 15-19 mm. Forewings light ochreous, more or less purple-tinged, sprinkled with dark fuscous; costal edge purple; a yellow blotch along costa near base, and another beyond middle; a fuscous transverse line at $\frac{1}{4}$, followed by a yellowish suffusion towards dorsum; stigmata dark grey, plical usually faint; a terminal purple line; cilia bright yellow except on tornus. Hindwings yellow-whitish, apex rosy-tinged.

England, Ireland, very common; C. and S. Europe; 7, 8. Larva pale green; dorsal line darker, paler-edged; head yellowish-green: in a flat web beneath leaves of oak, beech, apple, etc.; 5, 6.

2. Hypercallia, *Stph.*

Tongue developed. Antennae $\frac{4}{5}$, in ♂ with long fine cilia (3), basal joint with pecten. Labial palpi very long, second joint thickened with dense scales, rough beneath, terminal moderately long. Forewings: 7 to termen. Hindwings 1, ovate, cilia $\frac{1}{3}$; 3 and 4 connate.

Rather numerous in Australia; the single European species is a straggler. Imago with forewings suboblong, termen rather oblique.

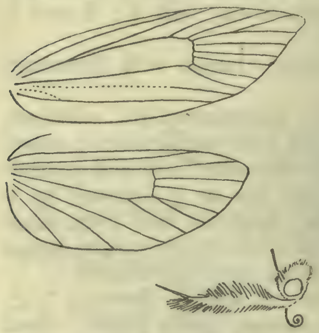
1. **H. christiernana**, *L.* (?*citrinalis*, Sc.) 16-20 mm. Forewings bright yellow; a streak along basal third of costa with two oblique projections, a slender fascia from middle of costa to $\frac{1}{3}$ of dorsum, connected by two downward-oblique bars with an irregular interrupted subterminal fascia, second discal stigma, and a narrow terminal fascia bright crimson. Hindwings grey.

Kent, Durham, local and scarce; C. and S. Europe; 6, 7.

Larva greenish-grey; dorsal line whitish; dots black, whitish-ringed; head and 2 black-speckled: in spun shoots of *Polygala;* 5.

3. Pleurota, *Hb.*

Tongue developed. Antennae $\frac{3}{4}$, in ♂ moderately ciliated, basal joint with pecten. Labial palpi extremely long, second joint very long, straight, porrected, with rough projecting scales above and beneath throughout, terminal rather short. Forewings: 7 to termen. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$; 3 and 4 connate or closely approximated.



Neuration and head of *Pleurota bicostella.*

A rather considerable genus; most of the known species inhabit S. Europe and Australia. Imago with forewings elongate, termen very oblique.

1. **P. bicostella**, *Cl.* 19-23 mm. Forewings fuscous, irrorated with whitish; a white costal streak from base to near apex, edged beneath by a brown streak; stigmata black. Hindwings grey.

Britain to Sutherland, N. Ireland, common; N., C., and SE. Europe, N. Africa; 6, 7. Larva pinkish-grey, marbled with brown on sides; dorsal and subdorsal lines brownish; dots blackish; head and plate of 2 yellowish-brown, latter darker-marked: in a web amongst shoots of *Erica;* 9-5.

4. Aplota, *Stph.*

Tongue developed. Antennae $\frac{3}{4}$, in ♂ moderately ciliated, basal joint with pecten. Labial palpi moderately long, slightly curved, thickened with loose rough scales, terminal joint short. Forewings: 7 to termen. Hindwings 1, elongate-ovate, cilia $\frac{3}{4}$; 3 and 4 connate.

Probably to be regarded as consisting only of the one species, though nearly approached by some Australian forms. Imago with forewings elongate, termen very oblique.

1. **A. palpella**, *Hw.* 11-13 mm. Head yellowish-ochreous. Forewings dark fuscous, sprinkled with light ochreous-yellowish; stigmata blackish, discal sometimes connected by a pale yellowish streak. Hindwings dark fuscous.

S. England to Essex and Hereford, local; Germany; 7, 8. Larva yellow-whitish; subdorsal and spiracular lines irregular, purplish; head and plate of 2 black: in silken galleries, gregariously, on moss; 10-6. The imagos are very retired in habit.

5. CHEIMOPHILA, *Hb.*

Tongue rudimentary. Antennae $\frac{2}{3}$, in ♂ moderately ciliated, basal joint without pecten. Labial palpi moderately long, second joint with long rough spreading hairs, terminal short, concealed. Forewings: 7 to termen. Hindwings 1, elongate-ovate, cilia $\frac{1}{2}$; 3 and 4 approximated or connate or seldom coincident. Wings in ♀ abbreviated, lanceolate, incapable of flight.

Contains only one species. Imago with forewings elongate, apex rounded, termen oblique. Larva with third pair of legs placed on a stem.

1. **C. salicella**, *Hb.* ♂ 17-20 mm. Forewings fuscous, somewhat whitish-sprinkled; costal edge whitish-rosy; an irregular ill-defined dark fuscous transverse rather oblique fascia before middle, not reaching dorsum, and transverse mark in disc at $\frac{2}{3}$, each preceded by a whitish suffusion. Hindwings fuscous.

♀. 7-8 mm. Forewings grey, whitish-sprinkled; blackish oblique median and posterior fasciae. Hindwings light grey.

England to Westmoreland, local; N. and C. Europe; 4. Larva dull whitish-green; spots grey; head blackish; 2 with a blackish-green crescentic plate: in rolled leaves of *Potentilla anserina*, perhaps also other plants; 6-9.

6. CHIMABACHE, *Hb.*

Tongue rudimentary. Antennae $\frac{3}{5}$, in ♂ moderately ciliated or with long fascicles, basal joint without pecten. Labial palpi moderate or long, second joint with dense loose scales somewhat projecting terminally, terminal short. Forewings somewhat rough-scaled; 7 to apex. Hindwings about 1, oblong-ovate, cilia $\frac{1}{4}$; 3 and 4 approximated or connate. Wings in ♀ abbreviated, lanceolate, incapable of flight.

Restricted to the two following species. Imago with forewings elongate, apex round-pointed, termen oblique.

♂	Antennae with long fascicles of cilia .	1. *phryganella.*
	„ shortly and evenly ciliated .	2. *fagella.*
♀	Palpi moderate (somewhat over 2) .	1. *phryganella.*
	„ very long (over 4) . . .	2. *fagella.*

1. **C. phryganella**, *Hb.* ♂ 21-25 mm. Antennae with long fasciculate ciliations. Forewings light ochreous-brown; sometimes a whitish sprinkling towards middle of costa and in disc beyond middle; stigmata very obscurely darker, second discal lying on an indistinct oblique darker shade from $\frac{3}{5}$ of costa to tornus. Hindwings grey.

♀. 17-19 mm. Forewings grey-whitish, irrorated with dark grey; stigmata and oblique marks before middle and above tornus blackish, sometimes partly connected.

England to Westmoreland, common; C. Europe; 10, 11. Larva yellow-whitish; head dark brown; plate of 2 brown-freckled; 3rd pair of legs placed on a shining tubercle (in ♂ only?): between joined leaves of oak; 6, 7.

2. **C. fagella**, *F.* ♂ 24-27 mm., ♀ 18-20 mm. Antennae of ♂ shortly and evenly ciliated. Forewings whitish or ochreous-whitish, sprinkled or sometimes densely irrorated with fuscous and dark fuscous; an indistinct blackish angulated transverse line about $\frac{1}{3}$, not reaching dorsum; stigmata black, first discal double, followed by another black dot, plical confluent with transverse line, second discal forming a transverse mark or pair of dots; often an angulated and indented blackish subterminal line. Hindwings light grey.

Britain to the Clyde, N. and E. Ireland, abundant; C. Europe; 4. Larva grey-green; head yellowish-grey; 3rd pair of legs placed on tubercle: between joined leaves of oak, beech, birch, etc.; 8-10.

7. SEMIOSCOPIS, *Hb.*

Tongue rather short. Antennae $\frac{2}{3}$, in ♂ shortly ciliated, basal joint without pecten. Labial palpi moderately long, second joint with appressed scales, terminal moderate or short. Forewings: 2 and 3 approximated or stalked, 7 to costa or apex. Hindwings 1, ovate, cilia $\frac{2}{3}$; 3 and 4 closely approximated.

A very small northern temperate genus. Imago with forewings elongate, apex round-pointed, termen very oblique.

Forewings with dark streak from base . 1. *avellanella.*
,, without dark streak from base 2. *steinkellneriana.*

1. **S. avellanella**, *Hb.* 21-23 mm. Forewings rosy-grey-whitish, sprinkled with pale fuscous; a dark fuscous streak from base along fold to $\frac{1}{3}$, thence bent upwards to disc before middle; second discal stigma forming a dark fuscous angulated mark; some dark fuscous scales tending to form dots on costa and termen; 2 and 3 separate. Hindwings pale greyish.

Britain to Perth, local; N. and C. Europe; 3, 4. Larva whitish-green; dorsal line darker; head and plate of 2 green: in a web beneath leaves of *Tilia parvifolia* (and probably other trees); 7-9.

2. **S. steinkellneriana**, *Schiff.* 18-21 mm. Forewings light brown, sometimes rosy-tinged, with a few dark fuscous scales; a small black subcostal dot near base; a bent blackish longitudinal mark in disc before middle; second discal stigma forming an angulated blackish transverse mark, connected with a fuscous spot on costa; 2 and 3 stalked. Hindwings light grey.

Britain to Sutherland, rather common; N. and C. Europe; 4. Larva whitish-green; dorsal line darker; head and plate of 2 black-marked: in a web beneath leaves of hawthorn and *Pyrus aucuparia;* 7-9.

8. ENICOSTOMA, *Stph.*

Tongue developed. Antennae $\frac{2}{3}$, in ♂ shortly ciliated, basal joint without pecten. Labial palpi very long, second joint somewhat rough beneath, terminal short. Forewings with scale-tufts on surface; 7 to costa. Hindwings 1, oblong-ovate, cilia $\frac{1}{2}$; 3 and 4 approximated or connate.

Only includes the one species. Imago with forewings elongate, termen oblique.

1. **E. lobella**, *Schiff.* 16-19 mm. Forewings fuscous; stigmata raised, blackish, first discal somewhat before plical, an additional blackish dot obliquely before and above it, and another below second discal. Hindwings grey.

Kent to Dorset and Norfolk, rather local; C. Europe; 6. Larva whitish-green, incisions whitish; dorsal line darker, edged with whitish lines; head whitish; 2 with a whitish central line and two black dots: in a web beneath leaves of blackthorn; 8, 9..

9. EXAERETIA, *Stt.*

Tongue developed. Antennae $\frac{2}{3}$, in ♂ pubescent, basal joint with pecten. Labial palpi very long, second joint thickened with dense scales, somewhat rough and furrowed beneath, terminal rather short, in ♀ thickened with scales towards base. Thorax crested. Forewings: 2 and 3 stalked, 7 to apex. Hindwings 1, oblong-ovate, cilia $\frac{3}{5}$; 3 and 4 connate.

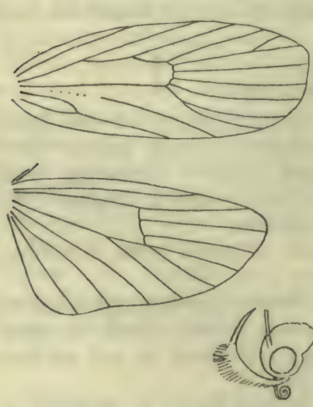
Also founded on a single species. Imago with forewings elongate-oblong, termen little oblique.

1. **E. allisella**, *Stt.* 20-21 mm. Forewings reddish-grey, irregularly and suffusedly irrorated with whitish; a cloudy ferruginous fascia from middle of costa to tornus, marked with a dark fuscous spot in middle, and edged anteriorly with whitish suffusion. Hindwings pale yellowish-grey.

Kent, Surrey, Norfolk, Cheshire to Cumberland, local; Germany, Finland; 7. Larva greyish-green, dorsally reddish-tinged; spots dark grey; head yellow-brown: in stems and roots of *Artemisia vulgaris;* 10-5.

10. DEPRESSARIA, *Hw.*

Tongue developed. Antennae $\frac{3}{4}$, in ♂ simple, basal joint with pecten. Labial palpi very long, second joint with dense roughly projecting scales and furrowed beneath, terminal shorter. Thorax sometimes crested. Abdomen flattened. Forewings: 2 and 3 sometimes stalked, 7 to costa or apex. Hindwings 1, oblong-ovate, cilia about $\frac{1}{2}$; 3 and 4 connate or short-stalked.



Neuration and head of ***Depressaria arenella.***

A very large genus, yet almost wholly confined to temperate regions of the Northern hemisphere, and mainly characteristic of Europe. Imago with forewings elongate-oblong or elongate, apex usually obtuse or rounded, termen little oblique. Larva usually feeding in rolled or spun leaves, especially on *Umbelliferae* and *Compositae.* Many of the species hibernate in the imago state, and these are particularly fond of concealing themselves in thatch.

1. Forewings with 2 and 3 stalked . . . 2.
   ,, ,, 2 and 3 remote . . . 26.
2. Forewings with blackish dot near base of dorsum 25. *rotundella.*
   ,, without such dot . . . 3.
3. First discal stigma obliquely preceded by a black dot, sometimes confluent to form a curved mark 4.
   First discal stigma single, dot-like . . 20.
4. Head and thorax white . . 18. *alstroemeriana*

Head and thorax not white . . . 5.
5. Second discal stigma red-circled . . 14. *ocellana.*
,, ,, ,, not red-circled . . 6.
6. Forewings with white suffusion on basal half of costa . . . 16. *ciniflonella.*
,, without white costal suffusion . 7.
7. First discal stigma forming a curved dash . 8.
,, ,, ,, not forming a curved dash . 9.
8. Patagia dark fuscous . . . 13. *hypericella.*
,, brownish . . 15. *conterminella.*
9. Second discal stigma whitish . . . 10.
,, ,, ,, dark fuscous . . 15.
10. First discal stigma partly white-edged . . 11.
,, ,, ,, not white-edged . . 13.
11. Forewings with dark fuscous blotch reaching middle of costa . . 20. *purpurea.*
,, without such blotch . . . 12.
12. Cilia of hindwings reddish-tinged . 22. *ciliella.*
,, ,, not reddish-tinged . 23. *applana.*
13. Forewings light yellow-ochreous, brownish-suffused 4. *atomella.*
,, light greyish-ochreous or fuscous . 14.
14. A dark fuscous spot between and above discal stigmata . . . . 17. *yeatiana.*
No dark central spot . . . 21. *capreolella.*
15. Forewings rosy-ochreous . . . . 16.
,, pale ochreous or brownish-ochreous . 17.
16. Second discal stigma placed in dark fuscous suffusion 19. *angelicella.*
,, ,, ,, not so placed . 11. *carduella.*
17. Costa distinctly spotted with dark fuscous . 18.
,, not so spotted . . 10. *subpropinquella.*
18. Forewings with apex evenly rounded . 24. *zephyrella.*
,, ,, apex obtuse . . . 19.
19. Forewings irregularly clouded with fuscous 8. *arenella.*
,, evenly tinged with brownish-ochreous 9. *propinquella.*
20. Forewings red-brown . . . 12. *cnicella.*
,, whitish-ochreous . . . 21.
21. Terminal cilia of forewings dark rosy-grey 1. *costosa.*
,, ,, ,, not dark rosy-grey . 22.
22. Veins marked with dark fuscous lines . 2. *umbellana.*
,, not marked with dark lines . . 23.

23. Hindwings ochreous-grey-whitish . . . 24.
,, grey . . . . 7. *nanatella.*
24. Forewings with dark subdorsal streak . 6. *pallorella.*
,, without such streak . . . 25.
25. Forewings with dark spot beneath second discal stigma . . . 5. *liturella.*
,, without such spot . . 3. *assimilella.*
26. Forewings with broad lighter reddish costal streak 27.
,, without such streak . . . 29.
27. Costal streak extending to ⅓ only 31. *chaerophylli.*
,, ,, ,, throughout . . 28.
28. Head and thorax pale yellowish . . 34. *depressella.*
,, ,, ,, not yellowish . 33. *pimpinellae.*
29. Head and thorax markedly paler than forewings . 30.
,, ,, ,, not paler than forewings . 32.
30. Head and thorax yellowish . . 28. *emeritella.*
,, ,, ,, not yellowish . . . 31.
31. Head and thorax whitish; forewings broader 27. *douglasella.*
,, ,, ,, rosy-grey-whitish; forewings narrower . 36. *pulcherrimella.*
32. All stigmata dot-like, dark fuscous 39. *discipunctella.*
Stigmata not all dot-like . . . . 33.
33. Terminal joint of palpi black except apex . 34.
,, ,, ,, with one or two black bands 35.
34. Pale fascia acutely angulated . . 29. *olerella.*
,, ,, somewhat obtusely angulated 30. *albipunctella.*
35. Terminal joint of palpi with one black band 35. *weirella.*
,, ,, ,, with two black bands . 36.
36. Forewings rather dark fuscous, uniform . 26. *badiella.*
,, light brownish, with dark dashes . 37.
37. Forewings with distinct blackish terminal dots 37. *heracliana.*
,, without separate terminal dots . 38.
38. Hindwings with 5 connate with stalk of 3 and 4 38. *nervosa.*
,, ,, 5 separate . . 32. *ultimella.*

Section A. Forewings with 2 and 3 stalked; base pale, edged by a dark erect mark from dorsum.

1. **D. costosa,** *Hw.* 16-21 mm. Forewings pale yellow-ochreous, more or less tinged especially dorsally with light brown-reddish and sprinkled with dots of blackish scales; first

discal stigma blackish, second whitish, often preceded by a red dot or dash, above which is sometimes a fuscous suffusion; terminal cilia dark rosy-grey except towards tornus. Hindwings ochreous-grey-whitish.

Britain to Caledonian Canal, E. Ireland, common; C. Europe; 7, 8. Larva grey, dorsal and subdorsal lines indistinctly darker; dots black; head and plate of 2 black: amongst spun shoots of *Ulex*, *Cytisus*, and *Genista;* 5, 6. A peculiar variety of the larva occurs on *Genista tinctoria;* green, lines brown-reddish; the imagos tend to be somewhat darker.

2. **D. umbellana**, *Stph.* 19-21 mm. Forewings whitish-ochreous; veins and dorsum marked with dark fuscous lines; first and sometimes second discal stigmata black; terminal black dots. Hindwings pale whitish-grey, round apex sometimes interruptedly dark-edged.

Britain to Caledonian Canal, E. Ireland, rather local; Holland, France, Spain; 8-4. Larva dull green; dots black; head and plate of 2 black: amongst spun shoots of *Ulex;* 6, 7.

3. **D. assimilella**, *Tr.* 18-20 mm. Forewings whitish-ochreous, often mixed with deeper ochreous or brownish, strewn with dots of blackish scales; first discal stigma blackish, second whitish, but usually obsolete, sometimes preceded by a reddish mark, across which lies often an oblique dark fuscous suffusion. Hindwings ochreous-grey-whitish.

Britain to Ross, E. Ireland, common; C. and SE. Europe; 6-8. Larva brown; dots black; head and plate of 2 black: between spun twigs of *Cytisus scoparius;* 11-4.

4. **D. atomella**, *Hb.* (*scopariella*, Hein.) 19-21 mm. Forewings pale yellow-ochreous, more or less sprinkled or sometimes wholly suffused with light rosy-brownish, with some scattered blackish scales; first discal stigma black, preceded by a similar dot obliquely above it; second whitish, often obsolete, sometimes preceded by a similar dot; sometimes a suffused dark spot above these; dark fuscous terminal dots. Hindwings whitish-grey, darker posteriorly.

England to Lancashire, E. Ireland, local; C. and S. Europe, Asia Minor; 7, 8. Larva dull green, sides more yellowish; dorsal and subdorsal lines darker; dots black; head pale brown; 2 pale green, with two black crescentic marks: amongst spun leaves of *Cytisus* and *Genista;* 4, 5.

5. **D. liturella**, *Schiff.* (*flavella*, Hb.; *bipunctosa*, Stt.) 19-21 mm. Forewings whitish-ochreous, sometimes more or less mixed with pale ferruginous-ochreous, usually with a few

blackish scales; first and second discal stigmata black, beneath second a dark grey spot, sometimes faint. Hindwings ochreous-grey-whitish, greyer posteriorly.

England, E. and S. Ireland, common; C. Europe, Asia Minor; 7, 8. Larva blackish; dots black; head and plate of 2 shining black: in rolled leaves of *Centaurea;* 5, 6.

6. **D. pallorella,** *Z.* 19-21 mm. Forewings whitish-ochreous, veins strewn with dots of dark fuscous scales; an indistinct dark fuscous longitudinal streak near dorsum from near base to before tornus; first and second discal stigmata black; terminal black dots. Hindwings ochreous-grey-whitish, greyer posteriorly.

England to Westmoreland, local; C. and SW. Europe; 8-4. Larva dull greenish, darker posteriorly; dorsal and subdorsal lines greenish-black; dots black; head red-brown; 2 pale reddish-brown, with two black crescentic marks: in rolled leaves of *Centaurea;* 6, 7.

7. **D. nanatella,** *Stt.* 14-15 mm. Forewings pale whitish-ochreous, brownish-tinged and strewn with brown strigulae; costa marked with spots of darker strigulae; first and sometimes second discal stigmata dark fuscous; sometimes a suffused fuscous spot between and above these. Hindwings grey, darker posteriorly.

England to York, E. Ireland, local; C. Europe; 7, 8. Larva yellow-green; dots grey; dorsal line darker; head and plate of 2 black: in rolled leaves of *Carlina;* 4-6.

8. **D. arenella,** *Schiff.* 18-22 mm. Forewings whitish-ochreous, more or less suffused with fuscous and sprinkled with dark fuscous; costa spotted with dark fuscous; first discal stigma and a dot obliquely before and above it black; second indistinct, dark fuscous; a dark fuscous spot between and above these; dark fuscous terminal dots. Hindwings pale whitish-fuscous.

Britain to Caledonian Canal, E. Ireland, very common; C. and SE. Europe; 9-5. Larva green, paler laterally; dorsal and subdorsal lines dark green; dots blackish; head light brownish-ochreous; 2 with two blackish spots: in folded leaves of *Centaurea*, *Carduus*, and *Arctium;* 6-8.

9. **D. propinquella,** *Tr.* 15-17 mm. Forewings whitish-ochreous, more or less wholly suffused with brownish-ochreous, with a few dark fuscous scales; costa spotted with dark fuscous; first discal stigma black, preceded by a less distinct dot obliquely above it, second indistinct, dark fuscous; a blackish,

dark fuscous, or ochreous-fuscous spot between and above these; terminal blackish dots, sometimes obsolete. Hindwings whitish-fuscous or pale fuscous.

England to Westmoreland, common; C. and SW. Europe; 9-4. Larva pale green; dorsal line darker; dots black; head and plate of 2 black: in a web beneath leaves of *Carduus;* 6-8.

10. **D. subpropinquella**, *Stt.* (*rhodochrella*, HS.) 18-21 mm. Thorax sometimes dark fuscous. Forewings light ochreous to brownish-ochreous, sometimes slightly reddish-tinged, with a few blackish scales; first discal stigma black, preceded by a similar dot obliquely above it, second blackish, often obsolete; a dark fuscous often suffused spot between and above these. Hindwings pale fuscous.

Britain to Perth, E. Ireland, common; C. and S. Europe, Asia Minor; 8-4. Larva green; dorsal line somewhat darker; dots grey; head and plate of 2 black: in a web beneath leaves of *Carduus* and *Centaurea;* 6, 7.

11. **D. carduella**, *Hb.* 14-16 mm. Forewings light rosy-ochreous, more or less sprinkled with fuscous; costa indistinctly spotted with fuscous; first discal stigma black, preceded by a similar dot obliquely above it, second blackish; a fuscous suffused spot between and above these; terminal dark fuscous dots. Hindwings ochreous-whitish.

England to Westmoreland, local; C. Europe; 7. Larva pale grey, sides greenish; spots black, whitish-ringed; head and plate of 2 black: in elongate whitish blotches in leaves of *Carduus;* 5, 6.

12. **D. cnicella**, *Tr.* 19-21 mm. Forewings dull red-brown, with a few grey scales; base whitish-grey, enclosing a dark grey mark on dorsum; first discal stigma whitish, often obsolete, second distinct, whitish, sometimes preceded by a similar dot; a faint fuscous spot between and above these. Hindwings grey, paler basally.

Kent to Hants and Suffolk, on coasts, local; C. Europe, Asia Minor; 6, 7. Larva dull green; dorsal line darker; dots blackish; head and plate of 2 black: gregarious, amongst spun shoots of *Eryngium maritimum;* 5.

13. **D. hypericella**, *Tr.* (*liturella*, Hb.) 17-19 mm. Head and thorax light ochreous-yellowish, patagia dark fuscous. Forewings crimson-fuscous, towards base and costa suffusedly mixed with blackish, with a few yellow-whitish scales; usually a yellow subbasal dot; an ill-defined yellowish costal spot before middle, and sometimes one at $\frac{3}{4}$; first discal stigma

represented by an oblique curved black mark. Hindwings fuscous, lighter basally.

England, rather common; N., C., and SW. Europe; 7. Larva dull green; head and plate of 2 yellow-brown: in spun shoots of *Hypericum;* 5, 6.

14. **D. ocellana,** *F.* 19-22 mm. Forewings whitish-ochreous, slightly fuscous-tinged, more or less sprinkled with black; first discal stigma black mixed with red, preceded by a similar dot obliquely above and sometimes connected with it, second white edged with red; between and above these a dark fuscous spot edged beneath with red; blackish terminal dots. Hindwings fuscous-whitish.

England, N. Ireland, common; C. Europe, N. Asia; 8-4. Larva pale green; dots black; head yellow-brownish: between spun leaves of *Salix;* 6, 7.

15. **D. conterminella,** *Z.* 17-19 mm. Head and thorax pale ochreous-yellowish, patagia brownish. Forewings crimson-fuscous, disc suffused with fuscous, more or less mixed with dark fuscous, with some yellow-whitish scales, sometimes forming spots on costa; base yellow-whitish, enclosing a dark dorsal mark; first discal stigma forming an oblique curved black mark, sometimes followed by yellow-whitish scales, second yellow-whitish. Hindwings whitish-fuscous.

England to Durham, N. and E. Ireland, common; Holland, Germany, W. Russia; 7-9. Larva light green; dots black; head yellow-brownish: in spun shoots of *Salix;* 5, 6.

16. **D. ciniflonella,** *Z.* 19-22 mm. Forewings ashy-fuscous, slightly reddish-tinged, sprinkled with dark fuscous and much mixed with whitish; a white suffusion along basal half of costa; first discal stigma elongate, black, often connected with a black dot obliquely before and above it, second whitish, edged with dark fuscous; blackish terminal dots. Hindwings light grey.

Perth, Inverness, local; N. Germany, W. Russia, N. America; 6-3. Larva purple-brown; spots black; head pale reddish; plate of 2 blackish: in folded leaves of birch; 4, 5.

17. **D. yeatiana,** *F.* 18-21 mm. Forewings pale greyish-ochreous, with a few black scales; veins sometimes marked with cloudy dark fuscous streaks; first discal stigma black, preceded by a similar dot obliquely above it, second white edged with dark fuscous; a dark fuscous spot between and above these; black terminal dots. Hindwings pale whitish-fuscous.

England, E. Ireland, common; C. and SW. Europe; 9-4.

Larva yellowish-green; head black: amongst spun shoots of *Daucus carota;* 6, 7.

18. **D. alstroemeriana**, *Cl.* 17-19 mm. Head and thorax white. Forewings white, more or less suffused with pale brownish-ochreous, with a few black scales; costa marked with blackish; first discal stigma black, preceded by a similar dot obliquely above it; a suffused blackish-grey spot touching middle of costa, edged beneath with a thick red mark; some black terminal dots. Hindwings whitish-grey, darker terminally.

Britain to Roxburgh, E. Ireland, common; C. and SW. Europe, N. Asia; 8-4. Larva pale green; dorsal and subdorsal lines darker; head yellowish-green: in rolled leaflets of *Conium maculatum;* 6, 7.

19. **D. angelicella**, *Hb.* 15-17 mm. Head light ochreous-yellow. Forewings rosy-ochreous, costa more rosy, somewhat sprinkled with dark fuscous; first discal stigma black, often minute or obsolete, preceded by a larger similar dot obliquely above it, second black, placed in a dark fuscous suffusion sometimes tending to form an indistinct fascia, plical sometimes distinct, black; blackish terminal dots. Hindwings whitish-grey.

Britain to Argyll, N. Ireland, rather local; C. Europe; 7-9. Larva greenish-grey; dots black; head reddish-ochreous; 2 ochreous-tinged: in spun shoots of *Angelica sylvestris;* 5, 6.

20. **D. purpurea**, *Hw.* (*vaccinella*, Hb.) 11-14 mm. Head grey, face white. Forewings crimson-fuscous, mixed with dark fuscous and whitish, especially towards costa; base more whitish; first discal stigma black, posteriorly whitish-edged, preceded by a similar dot obliquely above it, second white, edged with dark fuscous; between and above these a dark fuscous blotch reaching costa. Hindwings light grey, darker posteriorly.

England to Lancashire, E. and S. Ireland, rather local; C. and S. Europe, WC. Asia to N. Persia; 8-4. Larva yellowish; head and plate of 2 black: in spun leaves of *Anthriscus* and *Daucus;* 6, 7.

21. **D. capreolella**, *Z.* 14-16 mm. Forewings light fuscous; base pale; first discal stigma black, preceded by a similar dot obliquely above it, second white, obscurely dark-edged, preceded by a similar dot; dark fuscous terminal dots. Hindwings whitish-fuscous, darker terminally.

England to Westmoreland, E. Ireland, local; C. Europe, Asia Minor; 8-4. Larva green; dorsal and subdorsal lines darker; head and plate of 2 black: in spun radical leaves of *Pimpinella;* 6.

22. **D. ciliella**, *Stt.* 22-24 mm. Forewings red-brown, sometimes sprinkled with dark fuscous; first discal stigma blackish, posteriorly edged with a white dot, and preceded by a blackish dot obliquely above it, second white, sometimes obscurely dark-edged, usually preceded by a similar dot. Hindwings pale whitish-fuscous, cilia reddish-tinged.

England, N. Ireland, rather common; N. Europe, Holland, N. Germany, N. America; 8-4. Larva resembling that of *D. applana*, but head ochreous-yellowish: in spun leaves of *Angelica*, *Daucus*, *Selinum*, etc.; 6, 7.

23. **D. applana**, *F.* 18-21 mm. Forewings light fuscous, reddish-tinged, more or less mixed with whitish-ochreous and dark fuscous; base pale; first discal stigma black, partly whitish-edged, preceded by a similar dot obliquely above it, second white, dark-edged, preceded by a similar dot, above which is usually a suffused dark spot, plical often black; dark fuscous terminal dots. Hindwings whitish-grey.

Britain to Caledonian Canal, Ireland, abundant; N. and C. Europe, N. America; 8-4. Larva green; dorsal and subdorsal lines darker; dots black; head grey-green; 2 with two blackish-green crescentic marks: in rolled leaves of *Anthriscus*, *Heracleum*, *Angelica*, etc.; 5-7.

24. **D. zephyrella**, *Hb.* (*granulosella*, Stt.) 16-17 mm. Forewings pale greyish-ochreous, sprinkled with light fuscous, sometimes tinged with yellowish or reddish; costa spotted with darker fuscous; base pale; first discal stigma black, preceded by a similar dot obliquely above it, second dark fuscous, sometimes accompanied by a faint pale dot; between and above these a cloudy fuscous spot; dark fuscous terminal dots. Hindwings whitish-grey.

England to Westmoreland, local; Germany; 8-4. Larva in rolled leaves of *Anthriscus*, *Chaerophyllum*, etc.; 6, 7.

25. **D. rotundella**, *Dgl.* 14-16 mm. Forewings rather narrow, pale greyish-ochreous, sometimes somewhat fuscous-sprinkled posteriorly; subbasal mark of dorsum reduced to a dark fuscous dot; first discal stigma absent, a black dot obliquely before and above its usual position, second black; dark fuscous terminal dots, sometimes indistinct. Hindwings whitish-grey, darker terminally.

Kent to Dorset, Pembroke, Cheshire, E. Ireland, local; S. Europe, Asia Minor; 9-4. Larva green; dorsal and subdorsal lines darker; head and plate of 2 black: in rolled leaves of *Daucus carota*; 6-8.

Section B. Forewings with 2 and 3 remote; an ochreous-whitish dash on base of dorsum, edged above with dark fuscous.

26. **D. badiella**, *Hb.* (*libanotidella*, Stt., non Schl.) 22-23 mm. Terminal joint of palpi with two black bands. Forewings rather dark fuscous, somewhat whitish-sprinkled; a dark suffusion above dorsal dash; first discal stigma sometimes represented by an obscure dark fuscous dash, second cloudy, dark fuscous. Hindwings whitish-fuscous, becoming fuscous terminally.

England to York, rather local; C. and SE. Europe; 8, 9. Larva dull olive-green, often suffused with dark red; head dark red-brown; plate of 2 black, bisected, edged with pale yellowish anteriorly: between leaves or boring into heart of *Hypochoeris*, *Sonchus*, *Taraxacum*, etc.; 5-7. *D. libanotidella*, Schl., is a good species, but appears to have been erroneously recorded as British from a variety of *D. badiella*.

27. **D. douglasella**, *Stt.* 15-17 mm. Head and thorax whitish, patagia fuscous. Terminal joint of palpi with two black bands. Forewings brown, more or less mixed with dark fuscous and whitish, costal edge rosy-tinged; some inconspicuous darker dashes; first and second discal stigmata whitish, connected by a dark dash, first preceded by an oblique dark fuscous dash; an obscure paler angulated fascia about $\frac{2}{3}$. Hindwings whitish-grey, darker posteriorly.

Kent to Dorset, York to Westmoreland, E. Ireland, local; France, Holland, Germany; 7, 8. Larva green; dorsal and subdorsal lines darker; head yellowish-green: in spun leaves of *Daucus carota*; 5, 6.

28. **D. emeritella**, *Stt.* 21-23 mm. Head and thorax light yellowish-ochreous, patagia dark red-brown. Forewings reddish-fuscous, darker towards base, somewhat sprinkled with grey-whitish; some indistinct darker dashes; first and second discal stigmata whitish, first indistinct, elongate; an obscure pale angulated fascia about $\frac{3}{4}$. Hindwings whitish-grey.

Locality unknown but probably authentic, once only; Germany, N. America; 8, 9. Larva green; dorsal and subdorsal lines darker; head yellowish-green; 2 black-dotted: in rolled leaves of *Tanacetum*; 6, 7.

29. **D. olerella**, *Z.* 17-19 mm. Head brownish, face whitish.

Terminal joint of palpi blackish, tip whitish. Forewings ochreous-brown, sprinkled with whitish, sometimes slightly reddish-tinged; some dark fuscous dashes, one more distinct and oblique in disc before middle; second discal stigma white, dark-edged; an obscure pale acutely angulated fascia about $\frac{3}{4}$. Hindwings whitish-grey.

Surrey, Hants, local; N. and C. Europe; 8-4. Larva green; dorsal line darker; subdorsal sometimes reddish-tinged; head dark brown; 2 with two black crescentic spots: amongst spun leaves of *Achillea millefolium ;* 6, 7.

30. **D. albipunctella,** *Hb.* 17-19 mm. Head reddish-fuscous. Terminal joint of palpi blackish, tip whitish. Forewings broader than in *D. olerella,* brown, reddish-tinged, paler-sprinkled; some dark fuscous dashes, one more distinct and oblique in disc before middle; second discal stigma white, dark-edged; a pale somewhat obtusely angulated fascia before $\frac{3}{4}$; dark fuscous terminal dots. Hindwings whitish-grey.

Britain to the Clyde, rather local; C. and SW. Europe; 8-4. Larva pale green; dorsal line darker; subdorsal hardly darker; dots grey; head yellowish-green, with two black marks; 2 black-speckled: in rolled leaves of *Chaerophyllum* and *Anthriscus ;* 5-7.

31. **D. chaerophylli,** *Z.* 19-20 mm. Terminal joint of palpi blackish, tip whitish. Forewings pale reddish-grey, much sprinkled with dark grey and whitish; a light more reddish-tinged blotch along basal $\frac{1}{3}$ of costa; numerous blackish dashes; an obscure pale acutely angulated fascia at $\frac{3}{4}$; blackish terminal dots. Hindwings whitish-grey.

England, rather local; C. Europe, Asia Minor; 8-4. Larva yellow-green; dorsal and subdorsal lines broad, darker or blackish-green; dots black; head and 2 edged and spotted with black: amongst flowers of *Chaerophyllum temulum ;* 6, 7.

32. **D. ultimella,** *Stt.* 16-19 mm. Terminal joint of palpi with two blackish bands. Forewings light reddish-fuscous, more or less sprinkled with ochreous-whitish; numerous dark fuscous dashes; two indicating discal stigmata, connected by a line of whitish scales; an obscure pale acutely angulated fascia about $\frac{3}{4}$. Hindwings fuscous-whitish, more fuscous posteriorly; 5 separate.

England to York, common; Holland, Germany; 9-4. Larva pale green; dots dark brown; head pale brownish: in stems of *Oenanthe phellandrium ;* 6, 7.

33. **D. pimpinellae**, *Z.* 17-19 mm. Terminal joint of palpi with two blackish bands. Forewings light reddish-brown, sprinkled with dark fuscous and whitish except on a broad costal streak from base to ¾; numerous obscure dark fuscous dashes, except on costal streak; second discal stigma blackish; a faint pale angulated fascia at ¾. Hindwings whitish-fuscous, becoming fuscous terminally.

England, local; N. and C. Europe; 9-4. Larva grey, sides yellow-whitish; dots black, whitish-circled; head black; 2 with two black crescentic marks: amongst flowers of *Pimpinella saxifraga;* 7, 8.

34. **D. depressella**, *Hb.* 15-17 mm. Head and thorax pale ochreous-yellowish. Terminal joint of palpi with one blackish band. Forewings rather dark crimson-fuscous, lighter on a broad costal streak; scattered ochreous-grey-whitish scales, some forming an obscure dorsal spot beyond middle, and an angulated fascia at ¾, less marked towards costa. Hindwings whitish-fuscous, becoming fuscous terminally.

Kent, Essex, local; N. and C. Europe, Asia Minor; 9-4. Larva pale or deep green to ochreous-brownish, sometimes reddish-tinged; spots white; head and plate of 2 black: amongst flowers of *Daucus*, *Peucedanum*, and *Pimpinella;* 7, 8.

35. **D. weirella**, *Stt.* 17-19 mm. Terminal joint of palpi with one blackish band. Forewings light reddish-fuscous, somewhat sprinkled with darker fuscous and whitish; first and second discal stigmata obscure, whitish, more or less surrounded with darker; a faint pale angulated fascia at ¾. Hindwings whitish-fuscous.

England to Westmoreland, local; Germany; 7, 8. Larva green; dorsal and subdorsal lines darker; head greenish: in spun leaves of *Anthriscus* and *Conium;* 5, 6.

36. **D. pulcherrimella**, *Stt.* 15-17 mm. Head and thorax rosy-grey-whitish. Terminal joint of palpi with two blackish bands. Forewings rather narrow, light reddish-fuscous, sprinkled with whitish and dark fuscous; some indistinct dark fuscous dashes; one more conspicuous in disc before middle, followed by whitish scales; second discal stigma whitish; a faint pale angulated fascia at ¾. Hindwings fuscous-whitish, more fuscous posteriorly.

Britain to Perth, local; C. Europe; 7, 8. Larva in rolled leaves of *Pimpinella* and *Conopodium;* 6, 7.

37. **D. heracliana**, *De Geer.* 24-27 mm. Terminal joint of palpi with two blackish bands. Forewings light greyish-

ochreous suffused with pale brownish; some dark fuscous dashes, most distinct before fascia; more conspicuous cloudy dashes in place of stigmata, second discal stigma sometimes including a whitish dot; a distinct pale acutely angulated fascia at $\frac{3}{4}$; terminal blackish dots. Hindwings whitish-fuscous.

Britain to Argyll, Ireland, common; N. and C. Europe, N. America; 9-4. Larva grey, on sides dull yellow; spots black; head and plate of 2 black: amongst flowers and seeds of *Heracleum* and *Peucedanum;* 6, 7. Pupa in stem of food-plant.

38. **D. nervosa,** *Hw.* 21-23 mm. Terminal joint of palpi with two blackish bands. Forewings light brown, somewhat whitish-sprinkled, sometimes slightly reddish-tinged; numerous dark fuscous dashes; two indicating discal stigmata, between which is sometimes a line of pale scales; an obscure pale very acutely angulated fascia at $\frac{3}{4}$. Hindwings fuscous-whitish, more fuscous posteriorly; 5 connate with stalk of 3 and 4.

Britain to Argyll, E. Ireland, common; C. Europe, N. America; 9-4. Larva dark bluish-grey; lateral line orange-yellow; spots black, white-circled; head black; plate of 2 black, bisected, anterior edge whitish: amongst spun flowers of *Oenanthe crocata;* 6, 7. Pupa in stem of food-plant.

39. **D. discipunctella,** *HS.* (*pastinacella,* Stt., non Dup.) 22-24 mm. Terminal joint of palpi with two blackish bands. Forewings narrower than in *D. nervosa,* pale fuscous; stigmata dark fuscous, first discal somewhat beyond plical, preceded by a similar dot obliquely above it; between first and second discal a dark fuscous sometimes elongate dot; a faint paler angulated fascia at $\frac{3}{4}$; traces of dark dashes beyond it. Hindwings whitish-fuscous.

England to Westmoreland, local; France, Holland, Spain; 9-4.

11. Psecadia, *Hb.*

Tongue developed. Antennae $\frac{3}{4}$, in ♂ shortly ciliated, basal joint without pecten. Labial palpi moderate or long, second joint with appressed scales, terminal shorter. Forewings: 7 to costa or apex. Hindwings 1, elongate-ovate, cilia about $\frac{1}{3}$; 3 and 4 connate.

A rather small genus, widely distributed, but principally within the Northern hemisphere. Imago with forewings elongate, apex obtuse, termen rather oblique. Larva rather bright-coloured, in a slight web on leaves, usually on *Boragineae;* often occurring rather numerously together. The imagos are retired in habit and less frequently noticed.

1. Abdomen partly or wholly yellow . . 2.
   „ not yellow . . . . 3.
2. Forewings wholly blackish . . 1. *pyrausta.*
   „ not wholly blackish . . 4. *bipunctella.*
3. Forewings with black terminal blotch . 3. *funerella.*
   „ without black terminal blotch . 4.
4. Forewings with black longitudinal streak 5. *pusiella.*
   „ without black longitudinal streak 2. *decemguttella.*

1. **P. pyrausta,** *Pall.* 15-20 mm. Palpi moderate. Abdomen black, terminal half orange. Forewings blackish-grey; a black spot on fold near base; plical and second discal stigmata rather large, black. Hindwings rather dark grey.

Sutherland, once only, but would probably be found if looked for; NW. Russia, N. Asia; 5. Larva grey, with rows of orange-yellow spots: on *Thalictrum aquilegifolium;* 7, 8.

2. **P. decemguttella,** *Hb.* 16-21 mm. Palpi long. Forewings grey-whitish; eleven irregularly placed small black spots, one towards tornus largest. Hindwings grey.

S. England to Cambridge and Somerset, local; C. Europe; 6, 7. Larva yellow; dorsal area on 5-12 light grey-blue, dorsal line slender, blackish; subdorsal series of large black spots; head black: in a slight web on leaves of *Lithospermum officinale;* 8-10.

3. **P. funerella,** *F.* 15-17 mm. Palpi long. Forewings white; two spots on costa towards base, two towards dorsum anteriorly, an irregular median blotch resting on costa, and a terminal blotch black. Hindwings dark fuscous; in ♂ a suffused white tornal blotch.

Kent to Berks and Norfolk, York to Cumberland, local; C. Europe, Asia Minor; 5, 6. Larva pale yellow; dorsal series of bright yellow spots; subdorsal line dark purple-grey; head pale greyish-ochreous, with black lateral spots: in slight webs beneath leaves of *Symphytum;* 8-10.

4. **P. bipunctella,** *F.* 21-25 mm. Palpi long. Abdomen ochreous-yellow, deeper terminally. Forewings ochreous-grey-whitish; costal half blackish except at apex, lower edge with three irregular projections and an indentation before third; a terminal row of blackish dots. Hindwings grey-whitish, towards apex greyer, towards tornus pale yellowish.

Kent, Bucks, very scarce, perhaps a doubtful resident; C. and S. Europe, Asia Minor, N. Africa; 5, 8. Larva whitish; dorsal series of orange spots and black dots; subdorsal series of subconfluent blackish spots; spiracular line orange; subspiracular dark grey; head black: in a slight web amongst leaves and flowers of *Echium;* 6, 7, 9. Said to frequent poor sandy soil.

5. **P. pusiella**, *Roem.* 25-31 mm. Palpi long. Forewings white; a thick irregular median black streak from base of costa to near termen, with three quadrate projections on each edge; two spots towards costa anteriorly, one on middle of costa, two dots towards dorsum anteriorly, three together beneath costa at $\frac{3}{4}$, and a series along posterior half of costa and termen black. Hindwings grey-whitish, becoming greyer towards apex, white towards tornus.

Kent, recorded many years ago, perhaps now extinct; C. and S. Europe, WC. Asia to Turkestan; 6, 7. Larva on *Lithospermum* and *Pulmonaria;* 5.

12. HARPELLA, *Schrk.*

Tongue developed. Antennae $\frac{3}{4}$, in ♂ ciliated with long fascicles (4), basal joint with pecten. Labial palpi extremely long, second joint rough-scaled beneath and sometimes above, terminal shorter. Forewings: 7 to apex. Hindwings 1, elongate-ovate, cilia $\frac{3}{4}$; 3 and 4 connate.

A very small genus, inhabiting the European region. Imago with forewings elongate, apex rounded, termen very oblique. The species fly in bright sunshine.

Forewings with bluish-silvery streaks from base 1. *geoffrella.*
,, without such streaks . . 2. *bractella.*

1. **H. geoffrella**, *L.* 17-21 mm. Head and thorax yellow, with a central dark fuscous stripe. Forewings yellow, posteriorly becoming deeper and suffused with dark fuscous, especially on veins; a bluish-silvery blackish-edged streak from base above middle to $\frac{2}{5}$, thence bent down to join a similar straight subdorsal streak from base above middle of dorsum; a bluish-silvery blackish-edged transverse streak from costa before middle to disc; a large whitish-yellow dark-edged triangular spot on costa at $\frac{2}{3}$, and another before tornus. Hindwings dark fuscous.

England to York, S. Ireland, common; C. Europe; 5, 6.

2. **H. bractella**, *L.* 14-17 mm. Head and thorax yellow. Forewings dark fuscous; basal $\frac{2}{5}$ and a large costal spot beyond

⅔ bright yellow; a streak along basal ¼ of costa, a straight transverse streak bounding the yellow basal area, and a transverse mark in disc at ⅔ deep purple. Hindwings dark fuscous.

Monmouth, Durham, very local; C. Europe, Asia Minor; 6, 7. Larva grey; head pale brown; plate of 2 blackish, bisected: in decayed wood; 2-4.

13. OECOPHORA, *Latr.*

Tongue developed. Antennae ¾, thickened above with rough scales on basal half, in ♂ fasciculate-ciliated (1½), basal joint without pecten. Labial palpi long, second joint with appressed scales, terminal shorter. Forewings: 7 to costa. Hindwings 1, elongate-ovate, cilia ¾; 3 and 4 connate or stalked.

Includes only a few species, attached to the European region. Imago with forewings elongate, apex rounded, termen very oblique. Larva in decayed wood. The species fly actively in the sunshine; in repose the antennae are usually porrected.

Hindwings yellow . . . . 2. *sulphurella.*
" not yellow . . . 1. *oliviella.*

1. **O. oliviella**, *F.* 14-17 mm. Forewings purple-blackish, posterior half thinly strewn with yellow-whitish scales; a large triangular spot touching base, and a fascia before middle pale yellow; a streak above basal spot, a slender transverse fascia beyond it, and a curved transverse streak beyond middle not reaching dorsum purplish-leaden-metallic. Hindwings dark fuscous.

Kent to Hants and Essex, local; C. and S. Europe, Asia Minor; 6, 7. Larva in decayed wood of oaks; 12-4.

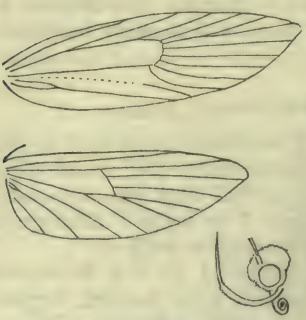
2. **O. sulphurella**, *F.* 12-16 mm. Forewings bronzy-brown, thickly strewn with ochreous-yellow scales; veins from base to beyond middle marked with bright iridescent-metallic lines; a yellow subcostal streak from base to middle; a triangular yellow spot before tornus, and a smaller whitish-yellow costal spot beyond this; a pale golden-metallic spot between these. Hindwings ochreous-yellow, irregularly margined with dark fuscous except on lower half of termen.

Britain to the Clyde, Ireland, common; C. and S. Europe, Asia Minor; 5, 6. Larva grey-whitish; dots blackish; head and plate of 2 reddish-brown: in decayed wood; 12-3.

14. ACOMPSIA, *Hb.*

Tongue developed. Antennae ¾, in ♂ ciliated (1-2), basal joint with pecten. Labial palpi long or rather long, second joint somewhat rough beneath, terminal as long or shorter. Forewings: 7 to costa. Hindwings 1 or under 1, elongate-ovate or ovate-lanceolate, cilia $\frac{3}{4}$-2; 3 and 4 connate or closely approximated.

A considerable genus, very widely distributed throughout all regions, but principally in temperate climates. Imago with forewings elongate, more or less pointed. Larva feeding on dry vegetable matter (seeds, dead leaves, decayed wood).



Neuration and head of *Acompsia pseudospretella.*

1.	Forewings wholly without markings	2.
	Forewings more or less marked	4.
2.	Palpi rather short	13. *panzerella.*
	,, very long	3.
3.	Thorax ochreous-yellow	11. *tinctella.*
	,, golden-brown	12. *unitella.*
4.	Forewings orange or deep yellow	5.
	,, not orange or deep yellow	9.
5.	Forewings with longitudinal silvery streaks	1. *grandis.*
	,, without silvery streaks	6.
6.	Forewings with white-edged dorsal spot	2. *formosella.*
	,, without white-edged dorsal spot	7.
7.	Forewings with dark fuscous apical spot	3. *woodiella.*
	,, without dark fuscous apical spot	8.
8.	Hindwings almost 1, elongate-ovate	4. *lambdella.*
	,, $\frac{3}{4}$, ovate-lanceolate	5. *lunaris.*
9.	Forewings with pale yellowish fascia	6. *augustella.*
	,, without pale fascia	10.
10.	Forewings with pale costal spot at $\frac{3}{4}$	11.
	,, without such spot	13.
11.	Forewings with a whitish costal spot before middle	9. *tripuncta.*
	,, without such spot	12.
12.	Forewings with pale yellowish subbasal spot	7. *similella.*
	,, without such spot	8. *minutella.*
13.	Head yellowish	14.
	,, brownish	15.

14. Second discal stigma transversely double 10. *subaquilea.*
,, ,, single, indistinct 14. *flavifrontella.*
15. Forewings with dark fuscous terminal spots
15. *pseudospretella.*
,, without terminal spots . 16. *fuscescens.*

1. **A. grandis**, *Desv.* 10-13 mm. Antennae with apex white. Forewings orange, margined with dark fuscous except at base of dorsum, more broadly on termen, forming a spot at base of costa; a transverse streak near base, and three longitudinal streaks in disc bluish-silvery, blackish-edged; a pale yellow spot on costa before middle, and a longer inwardly oblique one at $\frac{2}{3}$; a triangular yellow spot before tornus. Hindwings ovate-lanceolate, dark grey.

Worcester, Stafford, North Wales, local; Germany, Switzerland; 5, 6. Larva in decayed wood; 12-3.

2. **A. formosella**, *F.* 10-13 mm. Forewings orange; a subquadrate ferruginous spot on dorsum before middle, laterally edged with white streaks, posterior produced obliquely to middle of disc; an oblique trapezoidal ferruginous blotch about middle of costa, preceded in disc by an oblique white dash, and edged posteriorly with white; a suffused ferruginous spot on costa towards apex; some black scales above tornus and on edges of dorsal spot. Hindwings ovate-lanceolate, dark grey.

Essex, local; C. Europe; 7.

3. **A. woodiella**, *Curt.* 11-13 mm. Forewings bright orange; five dark fuscous spots, including some iridescent-metallic scales, first at base beneath costa, second on base of dorsum, third oblong, on middle of dorsum, fourth posteriorly attenuated on costa beyond middle, fifth large, irregular, occupying termen and apex. Hindwings ovate-lanceolate, dark fuscous.

Lancashire (near Manchester), once taken in plenty, not since 1829; not recorded elsewhere; 6. The species may be very local, and there is no necessity to suppose it extinct; the larva would probably feed in decayed wood.

4. **A. lambdella**, *Don.* 15-17 mm. Head whitish, mixed with dark fuscous. Forewings orange, towards margins more ferruginous; a narrow dark fuscous costal streak from base to $\frac{3}{4}$; a large triangular blackish spot before tornus, its apex irregularly produced towards apex of wing. Hindwings almost 1, elongate-ovate, dark grey.

S. England to Pembroke and Norfolk, S. Ireland, local; C. Europe; 6, 7. Larva very elongate, grey-whitish; head dark brown; plate of 2 pale yellow-brown, with sharp angle in middle of anterior margin: in dead twigs of *Ulex;* 9-5.

5. **A. lunaris**, *Hw.* 10-11 mm. Head whitish, mixed with dark fuscous. Forewings yellow, towards dorsum orange, costa from base to $\frac{2}{3}$ and termen broadly ferruginous; a narrow fuscous costal streak from base to $\frac{2}{3}$; a large triangular blackish spot before tornus, its apex irregularly produced towards apex of wing. Hindwings $\frac{3}{4}$, ovate-lanceolate, rather dark grey.

S. England to Hereford and Norfolk, local; C. Europe, Asia Minor; 7, 8.

6. **A. augustella**, *Hb.* (*albimaculea*, Hw.) 10-12 mm. Forewings blackish, obscurely fuscous-mixed; a fascia at $\frac{1}{4}$ dilated towards dorsum, a variable central fascia, a small tornal spot, and larger costal spot at $\frac{3}{4}$ yellow or whitish-yellow. Hindwings ovate-lanceolate, grey.

Middlesex, Gloucester, York, local; C. and S. Europe, Syria; 6. Larva under bark of elm, apple, etc.; 9-4.

7. **A. similella**, *Hb.* (*stipella*, Dbld., non. L.) 11-14 mm. Head ochreous-yellowish, with fuscous central stripe. Forewings dark fuscous; a spot near base, connected with base by a streak, a spot about middle on or near dorsum, a small spot beyond and above this, often connected with it, a spot on costa at $\frac{3}{4}$, and sometimes a tornal dot pale yellow. Hindwings under 1, grey.

Stafford to Perth, local; C. Europe; 6. Larva under dead bark of sycamore and *Pinus;* 9-4.

8. **A. minutella**, *L.* 11-13 mm. Forewings dark fuscous; a transverse ochreous-yellow tornal spot, and a smaller one on costa beyond it. Hindwings grey.

Britain to Ross, E. and W. Ireland, rather local; N. and C. Europe, Asia Minor; 5, 6. Larva whitish; head pale brown; plate of 2 pale yellow-brown: on dry seeds; 9-3.

9. **A. tripuncta**, *Hw.* (*trisignella*, Z.) 11-13 mm. Forewings dark fuscous; a whitish spot on costa before middle, another at $\frac{3}{4}$, and a third above tornus. Hindwings grey.

England to York, rather local; C. Europe, Asia Minor; 5, 6.

10. **A. subaquilea**, *Stt.* 12-14 mm. Head ochreous-yellowish. Forewings fuscous, more or less mixed with pale greyish-ochreous; a dark fuscous dot near dorsum before middle, an oblique mark in disc beyond it, two dots transversely placed in disc at $\frac{2}{3}$, a small spot on dorsum near tornus, and another on tornus. Hindwings grey.

Cheshire to Sutherland, on heaths, local; Spain; 5, 6.

11. **A. tinctella,** *Hb.* 13-16 mm. Head, palpi, and thorax ochreous-yellow. Forewings golden-ochreous, more or less fuscous-sprinkled, especially posteriorly. Hindwings rather dark grey.

England to Lancashire, rather common in woods; C. Europe; 5, 6. Larva in dead wood; 9-3.

12. **A. unitella,** *Hb.* (*fuscoaurella,* Hw.) 12-16 mm. Head orange. Palpi ochreous-yellow, terminal joint suffused with dark fuscous. Thorax golden-brown. Forewings golden-brown. Hindwings dark fuscous.

S. England to Gloucester and Norfolk, local; C. Europe; 7, 8. Larva dull dark brown; dorsal and subdorsal lines whitish; head red-brown; plate of 2 pale brown: in dead wood; 10-5.

13. **A. panzerella,** *Stph.* (*subochreella,* Dbld.) 14-17 mm. Head light greyish-yellowish. Palpi much shorter than in the two preceding species, light yellowish. Forewings light yellow-ochreous, more or less fuscous-sprinkled. Hindwings light fuscous.

Kent to Cambridge and Sussex, in woods, local; C. Europe; 6, 7.

14. **A. flavifrontella,** *Hb.* 19-21 mm. Head ochreous-yellow. Forewings fuscous; stigmata indistinctly darker, sometimes very faint, first discal slightly beyond plical. Hindwings grey.

Britain to Perth, rather local; Europe, WC. Asia to N. Persia; 6. Larva in a cylindrical case of fragments of lichen: on lichens and dead leaves; 9, 10.

15. **A. pseudospretella,** *Stt.* 19-23 mm. Head light brownish. Forewings pale brownish, coarsely and irregularly irrorated with dark fuscous; stigmata large, dark fuscous, first discal slightly before plical; a series of ill-defined dark fuscous spots close below apical third of costa and along termen. Hindwings whitish-grey, darker posteriorly.

Britain to the Shetlands, Ireland, very common in houses; N. and NC. Europe, N. America, Australia, New Zealand; 5-9. Larva yellow-whitish; head red-brown; plate of 2 pale ochreous: on seeds, dried plants, skins, etc.; 6-4. Not a native of Europe; it seems to have been first introduced about 1840, possibly from America; it has a marked constitutional preference for cool climates.

16. **A. fuscescens,** *Hw.* 9-12 mm. Head rather dark fuscous, face whitish-fuscous. Forewings light fuscous, coarsely

irrorated with dark fuscous; stigmata large, dark fuscous, first discal before plical. Hindwings grey.

Britain to Perth, E. Ireland, common; N. and NC. Europe; 7, 8. Larva on dead leaves; 10-4.

15. AMPHISBATIS, *Z.*

Tongue developed. Antennae $\frac{3}{4}$, in ♂ ciliated (1), basal joint with pecten. Labial palpi moderately long, second joint thickened with rough scales beneath, terminal shorter. Forewings: 7 absent (coincident with 8). Hindwings under 1, ovate-lanceolate, cilia 2; 3 and 4 connate.

Founded on the single species. Imago with forewings elongate, rather narrow, pointed. Larva case-bearing.

1. **A. incongruella**, *Stt.* 10-11 mm. Forewings rather shining fuscous. Hindwings fuscous.

England to Cumberland, local; C. and SW. Europe; 4. Larva on *Calluna*; 6.

4. ELACHISTIDAE.

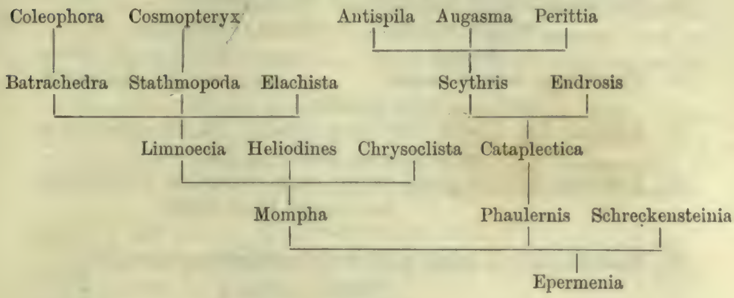
Head smooth. Tongue developed. Antennae $\frac{2}{3}$-1. Labial palpi smooth or rarely loosely scaled, nearly always acute, recurved when long. Maxillary palpi rudimentary. Forewings: 1b furcate or simple, 7 usually to costa, one or more veins often absent. Hindwings under 1, lanceolate or linear; 3 usually rising before angle, nearly parallel to 4, rarely connate, 6 and 7 approximated, stalked, or coincident, one or more veins often absent, cell often open posteriorly.

This is an extremely extensive family, fairly uniformly distributed throughout all regions. The wings of the imago are always narrow, often very narrow, and the neuration in consequence frequently degraded, several of the veins disappearing by coincidence.

Larva more or less elongate, with 10 prolegs, seldom almost apodal; usually mining in leaves or amongst seeds or in stems, sometimes case-bearing, rarely amongst spun leaves. Pupa with segments 9-11 free; not protruded from cocoon in emergence.

The phylogeny of the principal genera is expressed in the diagram.

Phylogeny of Elachistidae.


Coleophora
Cosmopteryx
Antispila
Augasma
Perittia
Batrachedra
Stathmopoda
Elachista
Scythris
Endrosis
Limnoecia
Heliodines
Chrysoclista
Cataplectica
Mompha
Phaulernis
Schreckensteinia
Epermenia

Tabulation of Genera.

1.	Forewings with 7 to termen, all veins present .	2.
	,, ,, 7 to costa, one or more veins often absent . . .	5.
2.	Forewings with dorsal scale-tooth . .	3.
	,, without dorsal scale-tooth . .	4.
3.	Labial palpi long, recurved .	25. Epermenia.
	,, ,, short, drooping .	23. Phaulernis.
4.	Forewings with 7 and 8 stalked .	22. Cataplectica.
	,, ,, 7 and 8 separate	24. Schreckensteinia.
5.	Palpi short, porrected or drooping . .	6.
	,, long, ascending	12.
6.	Forewings with 8 absent	7.
	,, ,, 8 present .	18. Douglasia.
7.	Forewings with 5 present . . .	8.
	,, ,, 5 absent	9.
8.	Forewings with 5 out of 7 . .	8. Stephensia.
	,, ,, 5 separate .	11. Heliodines.
9.	Forewings with 3 absent	10.
	,, ,, 3 present . . .	11.
10.	Forewings with 1b furcate . .	17. Augasma.
	,, ,, 1b simple . .	16. Antispila.
11.	Forewings with 1b furcate . .	19. Perittia.
	,, ,, 1b simple . .	15. Heliozela.
12.	Forewings with scale-tufts on surface . .	13.
	,, without scale-tufts . . .	15.
13.	Forewings with 5 absent . .	13. Chrysoclista.
	,, with all veins present . . .	14.

14. Hindwings with 6 absent . . . 12. PANCALIA.
„ „ 6 present . . . 14. MOMPHA.
15. Forewings with 6 separate, all veins present . 16.
„ with 6 out of 7, or one or more veins absent . . . . 19.
16. Hindwings with 6 absent . . . 21. ENDROSIS.
„ with all veins present . . . 17.
17. Antennae in ♂ with very long cilia 6. STATHMOPODA.
„ „ without long cilia. . . 18.
18. Terminal joint of palpi longer than second 9. LIMNOECIA.
„ „ „ not longer than second 10. ANYBIA.
19. Second joint of palpi with scales projecting beneath at apex . . . 20.
„ „ „ without scale-projection . 22.
20. Posterior tibiae smooth-scaled . . 1. GONIODOMA.
„ „ hairy . . . . 21.
21. Hindwings with 6 and 7 approximated or stalked 2. COLEOPHORA.
„ „ 5 and 6 stalked or coincident 4. BATRACHEDRA.
22. Antennae $\frac{3}{4}$-$\frac{4}{5}$ . . . . . 23.
„ almost 1 . . 5. COSMOPTERYX.
23. Hindwings with 6 and 7 stalked . . 7. ELACHISTA.
„ „ 6 and 7 not stalked . . 24.
24. Forewings with 4 absent . . . 3. ASYCHNA.
„ „ 4 present . . 20. SCYTHRIS.

1. GONIODOMA, *Z.*

Antennae $\frac{4}{5}$, basal joint thickened with rough tuft of scales. Labial palpi long, recurved, second joint with short angular projection of scales at apex beneath, terminal shorter, acute. Posterior tibiae smooth. Forewings: 1b furcate, 4 absent, 5 absent, 6 and 7 stalked, 7 to costa, 8 absent. Hindwings $\frac{2}{3}$, linear-lanceolate, cilia 6; transverse vein partly absent, 3 absent, 4 absent, 6 and 7 approximated or stalked.

A genus of three closely allied European species. Imago with forewings elongate, narrow; antennae in repose not directly porrected as in *Coleophora*, but enclosing an angle of 45°.

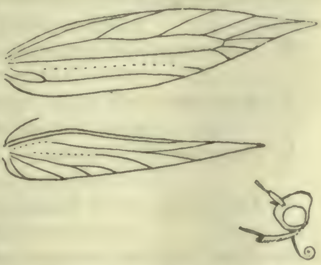
1. **G. limoniella**, *Stt.* (*auroguttella*, Stt., non F.R.) 10-11 mm. Head fuscous. Antennae white with dark fuscous rings, basal joint with loose fuscous hairs. Forewings ochreous-

orange; a slender costal streak from base to middle, a discal streak from $\frac{1}{3}$ to a spot at $\frac{2}{3}$, a streak along fold throughout, a dorsal streak from base to near tornus, three inwardly oblique marks on costa posteriorly, a streak along termen, and an apical dash golden-metallic, edged with dark fuscous scales. Hindwings rather dark grey.

Kent, I. of Wight, local; other records doubtful; 7, 8. Larva pale yellow; head, two spots on 2, and four on 3 brown: in a case made of a dead flower, on flowers of *Statice limonium;* 9. It bores into a stem for pupation, leaving the case attached outside.

2. Coleophora, *Hb.*

Antennae $\frac{4}{5}$, porrected in repose, often thickened with scales towards base, in ♂ simple, basal joint long, usually with rough scales or projecting tuft. Labial palpi rather long, recurved, second joint more or less rough-scaled or tufted towards apex beneath, terminal shorter, acute. Posterior tibiae rough-haired. Forewings with costa often long-haired beneath; 1b furcate, 4 sometimes absent, 5 absent, 6 and 7 connate or stalked, 7 to costa, 8 absent. Hindwings $\frac{2}{3}$, linear-lanceolate, cilia 3-4; transverse veins sometimes partly absent, 4 usually absent, 6 and 7 closely approximated or stalked.


Neuration and head of *Coleophora onosmella.*

A very large genus, but apparently confined to the Northern hemisphere, with the exception of two or three stragglers; it seems to reach its greatest development in Southern Europe, but is numerously represented throughout Europe, N. and C. Asia, and N. America. The species are often extremely similar and hard to distinguish accurately unless the habits of the larvae are known. Many are unicolorous; hardly any show a trace of the stigmata, and none have any transverse markings, but longitudinal lines on the veins are frequent. Imago with forewings very elongate-lanceolate. Larva mining when very young, afterwards inhabiting a portable case; attaching this to the leaf or seed-vessel on which it feeds, it bores into the interior; in leaves a pale blotch is usually produced, with a round hole in one membrane, which distinguishes the mines of this genus from all others. Pupa normally within the larval case. In repose the antennae are porrected straight forward, instead of being thrown back as usual. The genus is closely allied to *Batrachedra*, and probably a development of it. The internal evolution of the genus is obscure, but probably the *Juncus*-feeding species are the most ancestral (several exotic species of *Batrachedra* also feed on seeds of *Juncus*), giving rise to two main lines of development, represented by the unicolorous and vein-marked groups respectively.

1.	Second discal stigma distinct	2.
	All stigmata absent	3.
2.	Antennae thickened with scales towards base	28. *salicorniae.*
	,, not thickened	25. *hemerobiella.*
3.	Forewings wholly unicolorous, not white	4.
	,, white or with one or more pale streaks	25.
4.	Forewings shining brassy-bronze	5.
	,, greyish-bronze, or not bronzy	7.
5.	Antennae dark grey, apex white	6.
	,, white ringed with dark fuscous	1. *fabriciella.*
6.	Expanse 12-13 mm.	2. *deauratella.*
	,, 17-18 mm.	3. *frischella.*
7.	Forewings violet-blackish	4. *albitarsella.*
	,, not violet-blackish	8.
8.	Basal half of antennae wholly dark fuscous	9.
	,, ,, ,, not wholly dark fuscous	11.
9.	Apical half of antennae white with dark rings	9. *fuscocuprella.*
	,, ,, ,, not ringed	10.
10.	Forewings greyish-bronze	5. *alcyonipennella.*
	,, dark fuscous, sometimes bronzy-tinged	8. *paripennella.*
11.	Head yellowish	12.
	,, pale greyish-ochreous to fuscous	14.
12.	Forewings fuscous-ochreous	22. *olivacella.*
	,, ochreous-yellowish	13.
13.	Cilia towards tornus dark grey	21. *solitariella.*
	,, ,, ,, not dark grey	18. *lutipennella.*
14.	Forewings greyish-ochreous to deep ochreous	15.
	,, fuscous, bronzy, or grey	18.
15.	Forewings deep ochreous, coppery-tinged	15. *bicolorella.*
	,, lighter, not coppery-tinged	16.
16.	Antennae indistinctly ringed with fuscous	16. *viminetella.*
	,, sharply ringed with dark fuscous	17.

17. Forewings darker, more brownish-tinged . 14. *vitisella.*
,, lighter, more ochreous-tinged
12. *gryphipennella.*
18. Forewings bronzy or fuscous . . . 19.
,, dark or light grey . . . 21.
19. Forewings bronzy; expanse 8-9 mm. . 7. *potentillae.*
,, fuscous; expanse 10-12 mm. . . 20.
20. Forewings shining fuscous . . 6. *ahenella.*
,, rather dark fuscous, ochreous-tinged
17. *fuscedinella.*
21. Expanse 10 mm. or less . . . . 22.
,, 11 mm. or more . . . . 23.
22. Antennae ringed with dark grey . 24. *juncicolella.*
,, very indistinctly ringed with grey 23. *laricella.*
23. Apical third of antennae wholly white 13. *orbitella.*
,, ,, ,, dark-ringed . . 24.
24. Forewings brownish-grey . . . 11. *siccifolia.*
,, dark fuscous-grey . . 10. *nigricella.*
25. Antennae clothed with dense scales towards base . 26.
,, not clothed with dense scales . . 29.
26. Basal joint of antennae with long tuft . . 27.
,, ,, ,, not tufted . . 28.
27. Forewings with subcostal white streak . 30. *lixella.*
,, without subcostal white streak 31. *ochrea.*
28. Antennae ringed with dark fuscous . 27. *wockeella.*
,, not ringed with dark fuscous 26. *leucapennella.*
29. Forewings with silver-metallic streaks 29. *chalcogrammella.*
,, without metallic streaks . . 30.
30. Basal joint of antennae tufted . . . 31.
,, ,, ,, sometimes rough-haired,
not tufted . . 41.
31. Forewings white . . . . . 32.
,, yellow or ochreous . . . 34.
32. Costal cilia with distinct dark line . . 33.
,, ,, without dark line . 32. *anatipennella.*
33. Antennae ringed with dark fuscous, tuft longer
34. *palliatella.*
,, ringed with pale brownish, tuft shorter
33. *ibipennella.*
34. Forewings with white costal streak . . 35.
,, without white costal streak . . 39.
35. Antennae dark-ringed . . . . 36.
,, not dark-ringed . 38. *vibicigerella.*

36. Head light grey, whitish-mixed . 39. *pyrrhulipennella.*
   ,, white, crown sometimes ochreous-tinged . 37.
37. Costal streak reaching apex . . 42. *genistae.*
   ,, ,, not reaching apex . . . 38.
38. Forewings light yellowish . 40. *vulnerariae.*
   ,, dark brown, dorsally yellowish 41. *saturatella.*
39. Antennae fuscous-ringed . . 35. *currucipennella.*
   ,, not fuscous-ringed . . . 40.
40. Subcostal streak reaching costa posteriorly 37. *conspicuella.*
   ,, ,, not reaching costa . 36. *vibicella.*
41. Antennae unmarked or at most spotted beneath . 42.
   ,, darker-ringed . . . . 50.
42. Forewings with pale costal streak only . . 43.
   ,, with several pale streaks . . 44.
43. Forewings ochreous, costal streak white 44. *niveicostella.*
   ,, greyish-ochreous, costal streak paler or whitish . . 66. *sylvaticella.*
44. Forewings with scattered dark fuscous scales . 45.
   ,, without dark fuscous scales . . 47.
45. Forewings white, with pale yellowish streaks 47. *nutantella.*
   ,, ochreous, with fine white streaks . 46.
46. Forewings yellow-ochreous . 54. *graminicolella.*
   ,, more brownish-tinged . 64. *artemisicolella.*
47. Forewings yellow, with white streaks . 51. *inulae.*
   ,, white, with yellow or brown streaks . 48.
48. Streaks yellowish . . . . . 49.
   ,, brownish . . . . 50. *conyzae.*
49. Costal cilia whitish . . . 46. *onosmella.*
   ,, ,, yellow-ochreous . . 49. *lineolea.*
50. Forewings with only costal streak whitish . 51.
   ,, ,, other white streaks or series of scales . . . . 58.
51. Costal streak reaching base . . . 52.
   ,, ,, not reaching base . . . 57.
52. Forewings ochreous-brown . . . 53.
   ,, pale greyish-ochreous to fuscous . 54.
53. Antennae ringed with dark fuscous throughout 20. *badiipennella.*
   ,, with fuscous, towards apex indistinctly 19. *limosipennella.*
54. Forewings rather dark grey-brown . 71. *adjunctella.*
   ,, ochreous-grey or pale greyish-ochreous 55.

55. Antennae with apex wholly whitish . . 56.
,, ,, ringed with dark fuscous 72. *agrammella.*
56. Forewings paler, more ochreous-tinged; ovipositor weak . . 68. *glaucicolella.*
,, greyer; ovipositor strong 69. *caespititiella.*
57. Antennae whitish, with dark fuscous rings 61. *flavaginella.*
,, pale ochreous, with fine whitish rings 62. *salinella.*
58. Forewings with white streaks or scales towards costa posteriorly . . . 59.
,, without white scales towards costa posteriorly . . . . 71.
59. Forewings white, with indistinct whitish-ochreous streaks . . . 48. *apicella.*
,, ochreous or brownish, with white lines or scales . . . . 60.
60. Veins marked with scattered white scales . 61.
,, ,, defined white lines . . 63.
61. Anterior half of costa whitish . . . 62.
,, ,, ,, not whitish 60. *muehligiella.*
62. Forewings with black scales on veins 59. *laripennella.*
,, without black scales . 58. *squamosella.*
63. Forewings with scattered dark fuscous scales . 64.
,, without dark fuscous scales . . 67.
64. Forewings deep yellow-ochreous . . 57. *virgaureae.*
,, not deep yellow-ochreous . . 65.
65. Forewings ochreous . . . . 66.
,, brown-grey . . 63. *artemisiella.*
66. Forewings pale ochreous . . . 56. *argentula.*
,, dull brownish-ochreous . 55. *tripoliella.*
67. Whitish lines indistinct except on costa . 70. *obtusella.*
,, ,, distinct . . . . 68.
68. Forewings ochreous . . . . 69.
,, ochreous-grey . . 65. *murinipennella.*
69. Forewings yellow-ochreous . . . 70.
,, brownish-ochreous . . 53. *therinella.*
70. Forewings narrower, expanse 10-11 mm. 67. *alticolella.*
,, broader, expanse 12-14 mm. 52. *troglodytella.*
71. Forewings sprinkled with light fuscous 45. *albicosta.*
,, not fuscous-sprinkled . . 43. *discordella.*

1. **C. fabriciella,** *Vill.* 11-12 mm. Head metallic bronze. Antennae white, ringed with dark fuscous, basal half thickened

with dense rough dark coppery-bronzy scales. Forewings shining brassy-bronze, becoming coppery towards apex. Hindwings rather dark grey.

England to Durham, rather common; C. Europe, Asia Minor; 6, 7. Larva probably in seed-heads of one of the *Leguminosae.*

2. C. **deauratella**, *Z.* 12-13 mm. Head metallic bronze. Antennae dark grey, apex white, towards base thickened with dense dark coppery-bronzy scales. Forewings shining brassy-bronze, towards apex coppery-tinged. Hindwings dark grey.

England to Westmoreland, N. Ireland, local; N. and C. Europe, Asia Minor, Palestine; 6, 7. Larva brownish-yellow; plate of 2, two spots on 3, and two on 4 dark brown: in a case made of part of a floret, on flower-heads of *Trifolium;* 8, 9.

3. C. **frischella**, *L.* (*melilotella*, Scott) 17-18 mm. Head pale metallic bronze. Antennae dark grey, apex white, towards base thickened with coppery-bronzy scales. Forewings bright shining brassy-bronze, sometimes coppery-tinged. Hindwings rather dark grey.

Hants, Dorset, Herts, Cambridge, York, Durham, local; Sweden, France, Germany; 6, 7. Larva in a cylindrical case of seed-husks, on seeds of *Melilotus officinalis;* 8-10.

4. C. **albitarsella**, *Z.* 10-12 mm. Head shining blue-blackish or dark grey. Antennae white, ringed with dark fuscous except towards apex, towards base clothed with blackish scales. Tarsi white except towards base. Forewings shining violet-blackish. Hindwings dark grey.

England to Durham, rather common; C. Europe; 6, 7. Larva in a slender cylindrical slightly curved blackish brown case, on *Nepeta, Origanum, Calamintha,* etc.; 11-4.

5. C. **alcyonipennella**, *Koll.* 11-13 mm. Head metallic bronze. Antennae dark grey, apex whitish, base blackish, hardly thickened. Forewings shining greyish-bronze, sometimes coppery-tinged towards apex. Hindwings dark grey.

England, E. Ireland, common; C. Europe, Asia Minor, WC. Asia to Turkestan; 6, 7. Larva yellow-whitish; head, plate of 2, four spots on 3, and two on 4 black: in a straight cylindrical blackish silken case, with whitish lateral streak, on *Centaurea;* 9-6.

6. C. **ahenella**, *Hein.* 10-11 mm. Head shining fuscous. Antennae white, ringed with dark fuscous, basal joint rather dark fuscous. Forewings fuscous, somewhat shining. Hindwings dark grey.

Hants, Dorset, local; Germany; 6. Larva in a brownish cylindrical recumbent case, on *Rhamnus*, *Viburnum*, *Cornus*, etc.; 8, 9.

7. **C. potentillae**, *Stt.* 8-9 mm. Head shining bronze. Antennae white, ringed with dark fuscous, basal joint dark fuscous. Forewings rather shining bronze or greyish-bronze. Hindwings dark grey.

Sussex to Dorset and Essex, local; not recognised elsewhere; 6. Larva in case resembling that of *C. paripennella*, on *Potentilla*, *Rubus*, *Rosa*, *Spiraea*, etc.; 8, 9.

8. **C. paripennella**, *Z.* 10-11 mm. Head shining greyish-bronze. Antennae dark fuscous, apex white. Forewings rather dark fuscous, more or less bronzy-shining. Hindwings dark grey.

England to Durham, local; C. and SE. Europe; 5, 6. Larva dull ochreous-yellowish; head, plate of 2, and two spots on 3 black: in a subcylindrical recumbent case of leaf-fragments, with some dorsal anterior projections, on hazel, apple, rose, blackthorn, etc.; 7-10.

9. **C. fuscocuprella**, *HS.* (*fuscociliella*, Stt.) 9-10 mm. Head shining dark bronzy-fuscous. Antennae dark fuscous, apical half white with dark fuscous rings, indistinct towards apex. Forewings dark bronzy-fuscous. Hindwings dark grey.

England to Westmoreland, local; Germany; 5, 6. Larva in a brown nearly globular case, on hazel; 8, 9.

10. **C. nigricella**, *Stph.* 11-12 mm. Head shining grey, ochreous-tinged. Antennae white, ringed with dark fuscous, basal joint ochreous-grey. Forewings dark fuscous-grey, somewhat shining. Hindwings dark grey.

Britain to Perth, E. Ireland, common; C. and SE. Europe, Asia Minor; 6, 7. Larva in a nearly straight cylindrical light or dark fuscous case, on hawthorn, apple, and blackthorn; 5.

11. **C. siccifolia**, *Stt.* 12-13 mm. Head light greyish-ochreous. Antennae white, ringed with fuscous, basal joint pale greyish-ochreous. Posterior tarsi grey-whitish. Forewings brownish-grey, somewhat shining. Hindwings rather dark grey.

England, local; Germany; 6. Larva ochreous; head, plate of 2, and two spots on 3 black: in an irregular case formed from a large leaf-fragment, on hawthorn, apple, and birch; 7, 8.

12. **C. gryphipennella**, *Bch.* 11-13 mm. Head whitish-ochreous or greyish-ochreous. Antennae white, ringed with dark fuscous, basal joint whitish-ochreous. Forewings greyish-ochreous, in ♀ more ochreous. Hindwings rather dark grey.

Britain to Caledonian Canal, E. Ireland, very common; C. Europe; 6, 7. Larva yellow-brownish; head, plate of 2, and two spots on 3 black: in a cylindrical serrate-edged case formed of a leaf-fragment, on rose; 9-5.

13. C. **orbitella**, *Z.* (*Wilkinsoni*, Scott) 12-14 mm. Head shining fuscous. Antennae white, ringed with dark fuscous except on apical $\frac{1}{3}$, basal joint fuscous. Forewings shining brown-grey. Hindwings dark grey.

England to Westmoreland, local; Holland, Germany; 5, 6. Larva in a dark brown subcylindrical case of leaf-fragments, on birch and alder; 8, 9.

14. C. **vitisella**, *Gregs.* 10-12 mm. Head greyish-ochreous. Antennae white, sharply ringed with dark fuscous, basal joint greyish-ochreous. Forewings in ♂ ochreous-fuscous, in ♀ greyish-ochreous. Hindwings dark grey.

Cheshire, Lancashire, local; N. and NC. Europe; 6, 7. Larva brownish-ochreous; head pale brown; plate of 2, and two spots on 3 black: in a dark brown wrinkled somewhat pistol-shaped case, on *Vaccinium vitis-idaea;* 9-4.

15. C. **bicolorella**, *Stt.* 10-12 mm. Head deep shining ochreous. Antennae white, indistinctly ringed with fuscous, basal joint ochreous. Forewings deep shining ochreous, coppery-tinged. Hindwings blackish.

Hants, Middlesex, Lancashire, local; Holland; 6, 7. Larva in a brown pistol-shaped case, on alder; 9-5.

16. C. **viminetella**, *Z.* 10-12 mm. Head greyish-ochreous. Antennae white, indistinctly ringed with fuscous, basal joint greyish-ochreous, long. Forewings shining greyish-ochreous. Hindwings dark grey.

Britain to Caledonian Canal, N. Ireland, common; C. Europe; 6, 7. Larva ochreous-brownish; head, plate of 2, and two spots on 3 black: in a bicolorous case of leaf-fragments, anteriorly pale, posteriorly dark, on *Salix* and *Myrica;* 9-5.

17. C. **fuscedinella**, *Z.* 10-12 mm. Head light ochreous-fuscous. Antennae whitish, ringed with fuscous, more faintly or obsoletely towards apex, basal joint fuscous. Forewings rather dark fuscous, ochreous-tinged. Hindwings dark fuscous.

England, N. and E. Ireland, abundant; C. Europe; 6, 7. Larva in a brownish cylindrical case, on elm, alder, hazel, etc.; 9-5.

18. C. **lutipennella**, *Z.* 11-12 mm. Head pale yellow-ochreous. Antennae white, ringed with fuscous or dark fuscous,

basal joint whitish-ochreous. Forewings light yellow-ochreous. Hindwings grey.

England, common; C. Europe, Asia Minor; 6, 7. Larva in an ochreous cylindrical case, on oak and birch; 9-5.

19. **C. limosipennella**, *Dup.* 10-12 mm. Head pale ochreous, sides whitish. Antennae white, ringed with fuscous, basal joint whitish-ochreous. Forewings ochreous-fuscous, in ♀ more ochreous; a suffused white costal streak from base to beyond middle. Hindwings grey.

Britain to Perth, local; C. Europe, Asia Minor; 5, 6. Larva pale brownish; head dark brown; plate of 2 and two spots on 3 black; two greyish spots on 4: in a long cylindrical sometimes serrate-edged brown case, on elm, alder, and birch; 6-9.

20. **C. badiipennella**, *Dup.* 9-10 mm. Head light ochreous, on sides whitish. Antennae white, ringed with dark fuscous, basal joint whitish-ochreous. Forewings brown, becoming deep yellow-ochreous towards costa; a white costal streak from base to $\frac{2}{3}$. Hindwings grey.

England to York, local; Germany, Italy, Corsica; 6, 7. Larva in a short cylindrical dark brown case, on elm, ash, and blackthorn; 5.

21. **C. solitariella**, *Z.* 10-12 mm. Head pale ochreous-yellowish. Antennae white, ringed with dark fuscous, basal joint ochreous. Forewings ochreous-yellow; cilia towards tornus dark grey. Hindwings dark grey.

England to York, local; C. Europe; 7. Larva dull ochreous; head light brown; plate of 2, four spots on 3, and two on 4 blackish: in a cylindrical whitish case, formed of a leaf-fragment, on *Stellaria holostea;* 9-5.

22. **C. olivacella**, *Stt.* 11-13 mm. Head yellow-ochreous. Antennae white, ringed with dark fuscous, towards apex indistinctly, basal joint ochreous. Forewings fuscous-ochreous. Hindwings dark grey.

Kent, Derby, Lancashire, York, E. Ireland, local; Belgium, France, Germany; 6. Larva in a cylindrical ochreous-brownish darker-striped case, formed of a leaf-fragment, on *Stellaria holostea;* 9-5.

23. **C. laricella**, *Hb.* 9-10 mm. Head grey. Antennae grey-whitish, very indistinctly ringed with grey. Forewings shining grey. Hindwings grey.

Britain to the Clyde, N. Ireland, abundant; C. Europe, N. America; 6, 7. Larva brown; head, plate of 2, and two spots on 3 black: in a grey-whitish cylindrical case of leaf-fragments, on larch; 9-5. As the larch is not indigenous in Britain, the species must have been introduced with it.

24. **C. juncicolella**, *Stt.* 7-8 mm. Head ochreous-grey. Antennae grey-whitish, ringed with dark grey. Forewings shining grey, ochreous-tinged. Hindwings grey.

Britain to Caledonian Canal, common; Holland, Germany, Switzerland; 6, 7. Larva pale brown; head, plate of 2, and a spot on 3 black: in a case constructed of several heath-leaves, on *Calluna* and *Erica;* 9-4.

25. **C. hemerobiella**, *Sc.* 12-13 mm. Head grey-whitish. Antennae white, indistinctly ochreous-ringed, basal joint grey-whitish. Forewings grey-whitish, coarsely irrorated with dark grey; second discal stigma dark grey. Hindwings rather dark grey.

Dorset, Surrey, Essex, local; C. Europe; 7. Larva brownish-yellowish; head, plate of 2, and four small spots on 3 black; in a long straight cylindrical dark brown case, on pear, apple, cherry, and hawthorn; 9-5.

26. **C. leucapennella**, *Hb.* 16-18 mm. Head light brownish. Antennae white, thickened with rather rough light brownish scales to near middle. Forewings dark brown; a strong shining white costal streak from base almost to apex. Hindwings dark fuscous.

Norfolk, once only; C. and SE. Europe, Asia Minor; 6. Larva in a case formed of a seed-capsule, on seeds of *Lychnis viscaria*, *Silene nutans*, and *S. inflata;* 7-9.

27. **C. wockeella**, *Z.* 18-22 mm. Head light shining ochreous. Antennae white, ringed with dark fuscous except towards apex, basal $\frac{2}{3}$ thickened with dense rough brownish scales. Forewings ochreous-brown; veins posteriorly obscurely marked with rather dark fuscous streaks; a fine yellowish-white costal streak to near apex; a fine whitish line along fold. Hindwings dark grey.

Kent to Devon and Hereford, local; C. Europe, Asia Minor; 6, 7. Larva brown, dorsal line darker; head light brown; plate of 2, two spots on 3, and two on 4 black: in an elongate case of leaf-fragments, somewhat curved and attenuated posteriorly, on *Stachys betonica;* 9-5.

28. **C. salicorniae**, *Wk.* (*binotapennella*, Stt., non Dup.) 12-14 mm. Head ochreous. Antennae white, ringed with dark fuscous, basally thickened with ochreous scales in ♂ to $\frac{1}{6}$, in ♀ to $\frac{1}{3}$. Forewings ochreous, with some scattered blackish scales;

plical and second discal stigmata grey or fuscous. Hindwings pale grey.

Sussex, on coast, local; Germany; 7, 8. Larva in a case formed of a piece of hollowed stem, on stems of *Salicornia;* 10-5. Pupa subterranean, without the case.

29. **C. chalcogrammella**, *Z.* 8-10 mm. Head shining bronzy-grey. Antennae rather stout, black, apex white. Forewings deep yellow, apex blackish; a subcostal streak from near base, a submedian streak from base to tornus, and a dorsal streak from base to middle silver-metallic, edged with some black scales. Hindwings dark grey.

Suffolk to York, local; Holland, Germany, Austria; 6, 7. Larva grey-yellowish; head, plate of 2, and two spots on 3 black-brown: in a cylindrical keeled brown case of fragments of leaves, on *Cerastium arvense;* 10-5.

30. **C. lixella**, *Z.* 16-21 mm. Head white, crown yellow-tinged. Antennae whitish, basal $\frac{2}{5}$ clothed with hairs, basal joint with strong tuft. Forewings with apex falcate; yellow; a subcostal streak to before middle, a discal streak from before middle to $\frac{2}{3}$, a streak along fold, and several short streaks between veins towards costa posteriorly and termen silvery-white, blackish-edged. Hindwings dark grey.

England to Durham, local; C. Europe; 7. Larva dull brown; head, plate of 2, bisected plate of 3, and two spots on 4 black: first in case made of a seed-capsule, on *Thymus*, afterwards in ochreous cylindrical case of fragments of leaves, on *Briza*, *Holcus*, *Poa*, and other grasses; 3-5.

31. **C. ochrea**, *Hw.* 16-19 mm. Head ochreous. Antennae whitish, basal $\frac{2}{5}$ clothed with ochreous hairs, basal joint with strong tuft. Forewings yellow, suffusedly mixed with ferruginous, darker between veins towards costa; a streak along fold, another along dorsum to tornus, and a short streak before termen above tornus silvery-white. Hindwings grey.

England to Cheshire, local; C. Europe, Asia Minor; 7. Larva brown, 2-6 whitish; head pale brown; six spots above on 2, two on 3, and two on 4 black: in a long cylindrical pale greyish-ochreous case, on *Helianthemum;* 10-5.

32. **C. anatipennella**, *Hb.* 14-16 mm. Head white. Antennae white, ringed with pale brownish, basal joint with rather long tuft. Forewings white, posteriorly sprinkled with brownish, costal cilia without dark line. Hindwings rather dark grey.

Britain to the Orkneys, E. Ireland, rather common; N. and C. Europe; 7. Larva dull yellowish, anteriorly brownish-tinged; head and plate of 2 black; 3 with four triangular black-brown spots above: in a black pistol-shaped nearly erect silken case, on blackthorn, oak, *Salix*, etc.; 9-5.

33. **C. ibipennella**, *Z.* 10-14 mm. Head white. Antennae white, ringed with pale brownish, basal joint with rather short tuft. Forewings white; veins faintly yellowish-tinged, near apex more fuscous; costal edge anteriorly finely dark fuscous, near apex more strongly; costal cilia fuscous or dark fuscous except at base and tips. Hindwings rather dark grey.

England to York, local; Holland, Germany; 7. Larva pale yellowish, anteriorly pinkish-tinged; head, plate of 2, and four triangular spots on 3 black: in a black pistol-shaped obliquely recumbent silken case, on birch; 9-5.

34. **C. palliatella**, *Zk.* (*ardeaepennella*, Scott) 11-16 mm. Differs from *C. ibipennella* as follows: antennae ringed with rather dark fuscous, basal tuft longer; forewings with veins less yellowish-tinged, more fuscous posteriorly.

England to York, local; C. Europe; 7. Larva in a black pistol-shaped suberect silken case with two very large lateral scaly flaps, on oak, *Salix*, etc.; 9-5.

35. **C. currucipennella**, *Z.* 14-15 mm. Head white, crown yellowish-tinged. Antennae white, ringed with fuscous, basal joint with very long whitish-ochreous tuft. Forewings ochreous-yellow, posteriorly browner-tinged; a subcostal streak, one in disc from $\frac{1}{4}$, one along fold, one dorsal, and several short streaks between veins posteriorly shining white; some dark fuscous scales in apex. Hindwings rather dark grey.

England to York, local; C. Europe, Asia Minor, N. America; 7. Larva pale grey-yellowish; head dark brown; plate of 2 and four triangular spots of 3 black: in a black pistol-shaped suberect silken case with two lateral flaps and two dorsal series of oblique projections, on oak, *Salix*, hornbeam, etc.; 9-5.

36. **C. vibicella**, *Hb.* 17-21 mm. Head pale ochreous, sides whitish. Antennae white, basal joint with long ochreous tuft. Forewings yellow-ochreous; a subcostal streak from $\frac{1}{4}$ to $\frac{2}{3}$, a bent discal streak from $\frac{1}{2}$ to $\frac{3}{4}$, and a streak along fold not reaching tornus shining white, space between two former browner, continued to apex. Hindwings dark grey.

Sussex to Dorset and Hereford, local; C. Europe, Asia Minor; 7. Larva brown; head, plate of 2, and four spots on 3 black: in a black elongate pistol-shaped silken case, on *Genista tinctoria*; 5, 6.

37. **C. conspicuella**, *Z.* 13-15 mm. Head white, crown

yellowish-tinged. Antennae white, basal joint with long ochreous-whitish tuft. Forewings pale yellow; a strong streak from beneath costa at $\frac{1}{4}$ to costa at $\frac{2}{3}$, a short streak in disc beyond middle, a streak along fold and another along dorsum shining white; space between subcostal and discal streaks brown, extending to apex. Hindwings rather dark grey.

Surrey, local; C. Europe; 7. Larva brown; head, plate of 2, four spots on 3, and two on 4 black: in a rather flat slightly curved blackish-brown case of fragments of leaves, on *Centaurea;* 8-5.

38. **C. vibicigerella**, *Z.* 12-14 mm. Head white. Antennae white, basal joint with very long ochreous-greyish tuft. Forewings pale ochreous-yellow; a strong costal streak, a discal streak from $\frac{1}{3}$, a streak along fold and another along dorsum shining white; space between costal and discal streaks brown, extending to apex. Hindwings grey.

Essex, local; C. Europe, WC. Asia to N. Persia; 6, 7. Larva in a long curved somewhat flattened black silken case, on *Artemisia maritima* and *A. campestris;* 9-5.

39. **C. pyrrhulipennella**, *Z.* 11-12 mm. Head light bronzy-grey, whitish-mixed. Antennae white, ringed with fuscous, basal joint with light ochreous-greyish tuft. Forewings brownish-ochreous, lighter dorsally; a costal streak, one in disc from middle, one along fold, and one along dorsum shining white. Hindwings grey.

England to Westmoreland, common; C. Europe, Asia Minor; 7. Larva yellowish; head, plate of 2, four triangular spots on 3, and two on 4 black: in a long slender somewhat curved black silken case, on *Calluna* and *Erica;* 9-5.

40. **C. vulnerariae**, *Z.* 12-14 mm. Head white, crown ochreous-tinged. Antennae white, ringed with fuscous, basal joint with short yellowish tuft. Forewings light yellowish; a costal streak to near apex, one in disc posteriorly, one along fold, and one along dorsum white, edged with scattered fuscous scales. Hindwings grey.

Kent, local; C. Europe, Sicily, Asia Minor; 6. Larva on *Anthyllis vulneraria;* 5.

41. **C. saturatella**, *Stt.* (*tinctoriella*, Coverdale) 12-14 mm. Head white, sometimes light brownish on crown. Antennae white, ringed with dark fuscous, basal joint with short tuft. Forewings dark brown, becoming yellow-ochreous towards dorsum anteriorly and base; a strong white costal streak

from base almost to apex; a short fine line in disc, one along fold not reaching tornus, and another along dorsum white, sometimes very indistinct. Hindwings grey.

Sussex to Norfolk, Denbigh, local; not recorded elsewhere; 7. Larva grey-yellowish, anteriorly greenish-tinged; head, plate of 2, and two spots on 3 black: in a broad irregular case formed of fragments of mined leaves, on *Cytisus* and *Genista tinctoria;* 5, 6.

42. **C. genistae**, *Stt.* 11-13 mm. Head white, crown sometimes ochreous-tinged. Antennae white, ringed with dark fuscous, basal joint with very short rough tuft. Forewings ochreous-brown, becoming lighter ochreous towards base and dorsum; a strong white costal streak from base to apex; a short fine line in disc, one along fold, and another along dorsum white. Hindwings grey.

E. England to Hants and Northumberland, local; Holland, Germany; 7. Larva grey-yellowish; head, plate of 2, and two spots on 3 black: in a case formed of fragments of mined leaves, on *Genista anglica;* 9-5.

43. **C. discordella**, *Z.* 10-12 mm. Head white, crown sometimes ochreous-tinged. Antennae white, ringed with dark fuscous, basal joint with rather spreading hairs. Forewings shining yellow-ochreous, slightly brownish-tinged; a white costal streak from base to near apex; a short fine line in disc, one along fold, and one along dorsum white, often almost obsolete. Hindwings grey.

Britain to Caledonian Canal, N. and E. Ireland, common; C. Europe; 7. Larva yellow-whitish; head, plate of 2, four triangular spots on 3, and two spots on 4 brown: in a case formed of fragments of mined leaves, on *Lotus corniculatus;* 9-5.

44. **C. niveicostella**, *Z.* 11-13 mm. Head pale ochreous, sides whitish. Antennae white, basal joint ochreous. Forewings ochreous, somewhat darker towards costa; a white costal streak from base to near apex. Hindwings grey.

England to York, local; C. Europe; 6, 7. Larva in an elongate dark brown case, on *Thymus;* 9-5.

45. **C. albicosta**, *Hw.* 12-14 mm. Head pale ochreous, sides whitish. Antennae white, ringed with fuscous, basal joint ochreous-tinged, with rough spreading scales. Forewings light ochreous-yellowish, sprinkled with light fuscous, especially towards costa; a white costal streak from base to near apex; a white line in disc from before middle to termen, one along fold, and one along dorsum to apex. Hindwings grey.

Britain to Ross, E. and W. Ireland, common; France, Holland; 6, 7. Larva yellow-whitish, yellower posteriorly; head pale brownish; plate of 2, and four spots on 3 black: at first within pod, afterwards in a case formed of a pod, on seeds of *Ulex*; 8-4.

46. **C. onosmella**, *Brh.* 15-21 mm. Head ochreous-white. Antennae white, beneath spotted with fuscous, basal joint with rather rough hairs. Forewings white; veins (except 12) marked by cloudy pale yellowish-ochreous streaks. Hindwings grey.

Kent to Dorset, Suffolk to Cheshire, local; Europe; 6, 7. Larva greenish-grey; head, plate of 2, two spots on 3, and two on 4 black: in a thick pointed grey-whitish hairy case of leaf-fragments, on *Echium* and *Anchusa*; 9-5.

47. **C. nutantella**, *Mühl.* (*inflatae*, Stt.) 15-19 mm. Head ochreous-white. Antennae white, beneath spotted with fuscous, basal joint with rather rough hairs. Forewings white; all veins marked by pale ochreous-yellowish streaks, with a few scattered dark fuscous scales. Hindwings grey.

Sussex to Norfolk, local; Germany, Switzerland; 6. Larva pale yellowish; head brown, plate of 2 and four spots on 3 blackish; two faint dark spots on 4: in a cylindrical white silken case mixed with seed-fragments, on seeds of *Silene inflata* and *S. nutans*; 8, 9.

48. **C. apicella**, *Stt.* (*cacuminatella*, Dbld.) 11-13 mm. Head ochreous-white. Antennae white, ringed with fuscous, basal joint loosely haired. Forewings white; all veins marked by indistinct whitish-ochreous streaks, towards costa posteriorly and in apex mixed with fuscous. Hindwings grey.

England to Westmoreland, local; Holland; 7, 8. Larva on seeds of *Stellaria graminea*; 10.

49. **C. lineolea**, *Hw.* 11-14 mm. Head whitish-ochreous. Antennae white, basal joint with rather rough scales. Forewings white; veins marked by ochreous-yellow streaks, more or less confluent, especially towards costa posteriorly, leaving costa anteriorly rather broadly white; cilia round apex yellow-ochreous. Hindwings light grey.

Britain to the Shetlands, local; France, Germany; 7. Larva green-whitish; head pale brown; plate of 2, two spots on 3, and two on 4 black: in a broad hairy case of leaf-fragments, on *Ballota nigra* and *Stachys*; 9-5.

50. **C. conyzae**, *Z.* 13-16 mm. Head white. Antennae white, basal joint with somewhat rough scales. Forewings

white; veins marked by fine brownish streaks; a very fine line in cell posteriorly, and another along fold brownish. Hindwings grey.

Kent to Dorset, local; France, Germany; 7. Larva in a brownish hairy subcylindrical case of leaf-fragments, on *Inula;* 9-5.

51. **C. inulae**, *Wk.* 13-15 mm. Head whitish-ochreous, sides whitish. Antennae white, basal joint with somewhat rough scales. Forewings ochreous-yellow; a white costal streak, indistinct towards apex; 12, veins rising from cell, and lower margin of cell except anteriorly marked by white streaks; a white streak along fold, and another along dorsum to apex. Hindwings grey.

Surrey, local; Germany; 7. Larva in a long brownish streaked cylindrical case, more ochreous posteriorly, on *Inula;* 9-5.

52. **C. troglodytella**, *Dup.* 12-14 mm. Head whitish-ochreous. Antennae white, ringed with ochreous, basal joint loosely haired. Forewings yellow-ochreous; a white costal streak, indistinct towards apex; 12, veins rising from cell, upper margin of cell from $\frac{1}{4}$ to 11, and lower margin except anteriorly marked with white streaks; a white streak along fold, and another along dorsum to apex. Hindwings grey.

England to York, common; C. Europe; 7. Larva in a brownish-ochreous cylindrical case, on *Inula, Carduus, Eupatorium,* etc.; 9-5.

53. **C. therinella**, *Tgst.* 13-15 mm. Head whitish-ochreous, sides whitish. Antennae white, ringed with fuscous, basal joint loosely haired. Forewings narrower than in *C. troglodytella,* brownish-ochreous; white streaks as in *C. troglodytella,* but more indistinct. Hindwings grey.

England to Durham, local; C. and SE. Europe, Asia Minor; 6, 7. Larva in a long whitish cylindrical case, on *Carduus;* 9-5.

54. **C. graminicolella**, *Wk.* 13-15 mm. Head whitish-ochreous. Antennae white, spotted with brown beneath, basal joint loosely haired. Forewings yellow-ochreous, with a few scattered blackish scales; a white costal streak to near apex; 12, veins rising from cell, and lower margin of cell except anteriorly marked by white streaks; a white streak along fold, and another along dorsum to apex. Hindwings grey.

Surrey, Norfolk, local; Holland, Germany; 7.

55. **C. tripoliella**, *Hodgk.* 10-13 mm. Head greyish, sides

whitish. Antennae white, ringed with fuscous, basal joint loosely haired. Forewings narrow, dull brownish-ochreous; costa to near apex, veins, fold, and dorsum marked with white lines, edged with scattered dark fuscous scales. Hindwings rather dark grey.

Lancashire, in salt-marshes, local; not recorded elsewhere; 7, 8. Larva in a dark brownish rather long subcylindrical case, on seeds of *Aster tripolium;* 9, 10.

56. **C. argentula**, *Z.* 11-13 mm. Head whitish-ochreous, sides whitish. Antennae white, ringed with fuscous, basal joint loosely haired. Forewings pale ochreous, with scattered dark fuscous scales; a white costal streak to near apex; veins, fold, and dorsum marked by white streaks; costal cilia traversed by a cloudy dark grey line. Hindwings grey.

England to Cheshire, rather common; Holland, Germany, Austria; 7, 8. Larva whitish; head, plate of 2, four spots on 3, and four on 4 pale brown: in a short whitish cylindrical case, on seeds of *Achillea millefolium;* 9-11.

57. **C. virgaureae**, *Stt.* 11-13 mm. Head light ochreous, sides whitish. Antennae white, ringed with fuscous, basal joint loosely haired. Forewings deep yellow-ochreous, with scattered black scales; a white costal streak to near apex; veins, fold and dorsum marked by white streaks; costal cilia without grey line. Hindwings grey.

England to Westmoreland, E. Ireland, local; C. Europe; 7, 8. Larva whitish; head, four spots on 2, four on 3, and two on 4 pale brown: in a brownish subcylindrical case, with some down attached, on seeds of *Solidago;* 9, 10.

58. **C. squamosella**, *Stt.* 11-13 mm. Head grey. Antennae white, ringed with dark fuscous, basal joint loosely haired. Forewings greyish-fuscous; costa narrowly white to middle; along fold and towards termen numerous irregularly scattered white scales. Hindwings grey.

Surrey (Mickleham), two specimens many years ago; not recognised elsewhere; 8.

59. **C. laripennella**, *Zett.* (*annulatella*, Tgst.; *tengstromella*, Dbld.) 12-15 mm. Head light greyish-ochreous. Terminal joint of palpi more than half second. Antennae white, ringed with dark fuscous, basal joint greyish-ochreous, loosely haired. Forewings brownish-ochreous; costa suffusedly white to about $\frac{3}{4}$; veins and fold more or less marked with scattered black and white scales. Hindwings grey.

Britain to the Clyde, E. Ireland, common; N. and C.

Europe; 7, 8. Larva at first in a case of seed-fragments, afterwards in a cylindrical brownish case set with sand-grains, on seeds of *Chenopodium* and *Atriplex;* 9-5.

60. **C. muehligiella**, *Stt.* 13-14 mm. Head brownish. Antennae white, ringed with dark fuscous, basal joint brownish, loosely haired. Forewings ochreous-brownish; costa hardly whitish beyond middle; veins and fold marked with rows of dark fuscous and whitish scales. Hindwings rather dark grey.

Sussex, on coasts, local; Germany; 6, 7. Larva in a cylindrical case, on seeds of *Atriplex portulacoides;* 8, 9.

61. **C. flavaginella**, *Z.* 13-14 mm. Head greyish-ochreous. Antennae whitish, ringed with dark fuscous, basal joint greyish-ochreous, loosely haired. Forewings broader than in *C. muehligiella*, grey-brownish; costa narrowly whitish towards middle; sometimes a few dark fuscous scales on veins. Hindwings rather dark grey.

Kent to Dorset, local; NC. Europe; 6, 7. Larva pale yellowish; head, plate of 2, and four spots on 3 brown: in an ochreous-whitish darker-striped silken recumbent case, on leaves and seeds of *Suaeda maritima;* 7, 8.

62. **C. salinella**, *Stt.* 11-13 mm. Head whitish-ochreous. Terminal joint of palpi less than half second. Antennae light ochreous, with fine whitish rings. Forewings pale brownish-ochreous, with scattered blackish scales on veins and fold; costa more whitish-tinged towards middle. Hindwings grey.

England to Lancashire, on coasts, local; not recorded elsewhere; 8. Larva in a cylindrical case, on seeds of *Atriplex portulacoides;* 9-5.

63. **C. artemisiella**, *Scott.* 11-13 mm. Head grey. Antennae white, ringed with fuscous. Forewings pale brownish-grey, with numerous scattered black scales; costa white from base to near apex; veins marked with indistinct whitish lines. Hindwings pale grey.

Essex, Norfolk, Roxburgh, E. Ireland, local; not recorded elsewhere; 7, 8. Larva in an ochreous-greyish cylindrical case, on seeds of *Artemisia maritima;* 8, 9.

64. **C. artemisicolella**, *Brd.* (*albicans*, HS.) 10-13 mm. Head whitish. Antennae whitish. Forewings ochreous; costa, veins, and dorsum marked with fine clear white lines, with scattered black scales on them. Hindwings pale grey.

Kent, Cheshire, local; France, Germany; 7. Larva greenwhitish; head yellow-brown; plate of 2 and four spots on 3 pale brown: in an oval case formed of a dead flower, on seeds of *Artemisia vulgaris;* 8, 9.

65. **C. murinipennella,** *Dup.* 11-12 mm. Head pale greyish-ochreous. Antennae white, ringed with fuscous. Forewings narrow, ochreous-grey; costa whitish from base to near apex; veins marked by whitish lines; costal cilia posteriorly greyish, tips white. Hindwings grey.

England to York, E. Ireland, common; C. Europe; 5, 6. Larva pale pinkish-ochreous, more whitish anteriorly; head blackish-brown; plate of 2, four spots on 3, and two on 4 black: in an elongate brownish-ochreous silken case, on seeds of *Luzula campestris* and *L. multiflora;* 7-9.

66. **C. sylvaticella,** *Wood.* 11-13 mm. Head greyish-ochreous. Antennae white. Forewings greyish-ochreous; costa somewhat paler or whitish-tinged; costal cilia posteriorly pale ochreous. Hindwings grey.

Hereford, local; not yet recorded elsewhere; 5, 6. Larva dull whitish; head, plate of 2, four spots on 3, and two on 4 brown: in a silken case partly enclosed in fragments of seed-capsules, on flowers and seeds of *Luzula sylvatica;* living nearly two years in the larval state, from July in the first year to April in the third.

67. **C. alticolella,** *Z.* 10-11 mm. Head pale ochreous. Antennae white, ringed with light fuscous anteriorly except at apex. Forewings light yellow-ochreous; costa white to near apex; veins marked with fine whitish lines; costal cilia posteriorly pale yellow-ochreous, tips white. Hindwings grey.

S. England to Hereford and Cambridge, local; Germany; 7. Larva ochreous-reddish, paler anteriorly; head brown; plate of 2, and four spots on 3 dark grey or blackish: in a silken case partly enclosed in fragments of seed-capsules, on seeds of *Juncus articulatus;* 8-11.

68. **C. glaucicolella,** *Wood.* 10-12 mm. Differs from *C. caespititiella* only as follows: forewings paler and more yellowish or ochreous-tinged, usually with darker greyish streaks between veins towards costa; ovipositor of ♀ weak, slender, flexible.

S. England to Hereford and Cambridge, common; not yet recognised elsewhere; 7, 8. Larva in a cylindrical whitish silken case, on seeds of *Juncus glaucus,* etc.; 9-5.

69. **C. caespititiella,** *Z.* 10-12 mm. Head light greyish-ochreous. Antennae white, ringed with fuscous anteriorly except towards apex. Forewings greyish-ochreous, sometimes

whitish-sprinkled, rather shining; costa distinctly white from base to $\frac{2}{3}$, shading into cilia posteriorly; rarely somewhat darker streaks between veins towards costa. Hindwings grey. Ovipositor of ♀ strong, stiff.

Britain to the Hebrides, Ireland, very common; C. and S. Europe, N. Africa, N. America; 6, 7. Larva yellow-brownish; head, plate of 2, and four spots on 3 black: in a cylindrical whitish silken case, on seeds of *Juncus communis*, *J. squarrosus*, etc.; 8-10.

70. **C. obtusella**, *Stt.* 10-11 mm. Head whitish-brown. Antennae white, ringed with fuscous. Forewings light brownish, with a few darker scales; costa whitish from base to $\frac{2}{3}$; veins indistinctly marked with whitish lines. Hindwings grey.

SE. England to Dorset and Lincoln, in salt-marshes, local; not recognised elsewhere; 7. Larva in a silken case partly enclosed and terminating with fragments of seed capsules, on seeds of *Juncus maritimus*; 9-5.

71. **C. adjunctella**, *Hodgk.* (*paludicola*, Stt.) 8-9 mm. Head brownish. Antennae dark fuscous, faintly ringed anteriorly with whitish. Forewings rather dark shining greyish-brown; costa narrowly white to beyond middle. Hindwings grey.

England to Lancashire, in salt-marshes, local; not yet recognised elsewhere; 6, 7. Larva yellow-whitish; head light reddish; plate of 2, and four spots of 3 pale, brown-marked: in a silken case partly enclosed with fragments of seed-capsules, on seeds of *Juncus compressus*; 8, 9.

72. **C. agrammella**, *Wood.* 8-9 mm. Head ochreous-grey. Antennae white, ringed with dark fuscous. Forewings ochreous-grey; costa narrowly white to beyond middle. Hindwings grey.

Hereford, local; not yet recorded elsewhere; 6. Larva yellowish-white; head brown; plate on 2, four spots on 3, and two on 4 grey: in a grey or blackish silken cylindrical case with alternate smooth and granulated stripes, on seeds of *Juncus communis*, *J. articulatus*, etc.; 8-10.

3. ASYCHNA, *Stt.*

Antennae $\frac{3}{4}$, in ♂ simple. Labial palpi moderately long, ascending, second joint smooth, terminal shorter, acute. Posterior tibiae rough-haired. Forewings: 1b furcate, 4 absent, 5 absent, 6 and 7 stalked, 7 to costa, 8 absent. Hindwings $\frac{2}{3}$, lanceolate, cilia 3; 4 absent.

Now restricted to the following species, which has close collateral relationship with *Coleophora*, though the antennae are not porrected in repose. Imago with forewings elongate-lanceolate.

1. **A. modestella**, *Dup.* 9-11 mm. Head shining bronzy. Posterior tibiae ochreous-whitish. Forewings light shining greyish-bronzy. Hindwings bronzy-grey.

England to York, E. Ireland, local; C. Europe; 5. Larva yellow-whitish; head and plate of 2 marked with dark brown: in seed-capsules of *Stellaria holostea*, later in a portable case made of a capsule; 6, 7. The imago is fond of sitting in the flowers of its food-plant.

4. BATRACHEDRA, *Stt.*

Antennae $\frac{5}{6}$, in ♂ simple. Labial palpi long, recurved, second joint with scales somewhat angularly projecting beneath at apex, terminal as long or shorter, somewhat rough anteriorly, acute. Posterior tibiae loosely haired. Forewings: 1b obsoletely furcate, 5 absent, 6 and 7 sometimes stalked, 7 to costa, 8 absent. Hindwings $\frac{1}{2}$, linear, cilia 6-8; transverse vein absent, 3 and 4 sometimes absent, 5 and 6 stalked or coincident.

A small but cosmopolitan genus, more numerous in the Australian region than elsewhere. Imago with forewings very elongate, narrow, long-pointed. The species sit with the fore-part somewhat raised, but the anterior legs rather withdrawn beneath the body.

Forewings very densely irrorated with blackish
1. *praeangusta*.
,, at most thinly irrorated . . 2. *pinicolella*.

1. **B. praeangusta**, *Hw.* 13-15 mm. Forewings whitish-ochreous or ochreous-whitish, more ochreous along fold, very densely irrorated with blackish, more thinly towards costa anteriorly; plical and second discal stigmata large, elongate, black, pale-ringed, each often preceded by a short blackish dash. Hindwings grey.

England, E. Ireland, common; C. Europe, N. America; 7. Larva pale greenish-yellow; subdorsal lines broad, brown-reddish; head brown, posteriorly black; plate of 2 black: in catkins of poplar and *Salix* (seldom between joined leaves); 4-6.

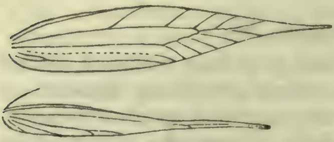
2. **B. pinicolella**, *Dup.* 11-13 mm. Head whitish. Forewings light yellow-ochreous, sometimes thinly sprinkled with dark fuscous; costa and sometimes dorsum slenderly suffused with dark fuscous; plical and second discal stigmata black,

former rather elongate, sometimes nearly obsolete. Hindwings rather dark grey.

S. England to Hereford and Norfolk, local; C. Europe; 7. Larva reddish-brown; head black; plate of 2 black, anterior edge white: in a silken gallery amongst needles of *Pinus sylvestris* and *P. excelsa;* 9-5.

5. Cosmopteryx, *Hb.*

Antennae nearly 1, in ♂ simple, basal joint very long. Labial palpi very long, recurved, second joint smooth, terminal longer, acute. Posterior tibiae rough-haired. Forewings: 1b furcate, 5 sometimes absent or out of 7, 6 out of 7, 7 to costa, 8 out of 7. Hindwings ½, linear, cilia 5-7; transverse vein absent, 3 sometimes absent, 4 absent, 5 absent.



Neuration of *Cosmopteryx druryella.*

A genus of few species but very general distribution, occurring in Europe, Asia, Africa, N. America, and Australia. Larva mining in leaves. Pupa in a silken cocoon, usually without the mine. Imago with forewings very narrow, long-pointed or caudate. When sitting in the sunshine, the species have a habit of twirling the long antennae with a graceful motion.

1. Forewings brownish-ochreous . . 1. *lienigiella.*
,, black . . . . . 2.
2. Forewings with large basal brassy patch 2. *druryella.*
,, with brassy fascia near base . . 3.
3. Apical line entire . . . . 3. *schmidiella.*
,, broken into two dashes . . 4. *eximia.*

1. **C. lienigiella,** *Z.* 9-14 mm. Forewings light brownish-ochreous; costal and dorsal edges white; a fine white longitudinal subcostal line from costa near base to ⅓, another along fold from base to middle, and a short one beneath posterior extremity of this; a somewhat brighter fascia beyond middle, narrowed dorsally, edged with pale golden-metallic streaks, posterior interrupted, anterior followed by a variable black spot above middle; a white longitudinal streak from near beyond this to apex. Hindwings grey.

Norfolk, Cambridge, in fens, local; N. Germany, NW. Russia; 6, 7. Larva rosy-whitish, sometimes with rosy transverse bands; dorsal line darker; head black; 2 broad, with a black mark: in pale blotches in leaves of *Phragmites communis;* 9. Pupa within the mine.

2. **C. druryella**, *Z.* (*orichalcea*, Stt.) 8-10 mm. Antennae with apex and two subapical rings white. Forewings black; a large brassy-metallic basal patch, edge very oblique; a broad orange fascia beyond middle, narrowed dorsally, edged with black scales and then with narrow violet-golden-metallic fasciae; a bluish-silvery-metallic sometimes interrupted streak along upper part of termen to apex. Hindwings dark grey.

Hants, Wilts, Hereford, Suffolk, Norfolk, Cambridge, local; Germany; 6. Larva pale yellow; dorsal line greenish; head black; plate of 2 black, bisected: in clear white galleries in leaves of *Milium*, *Hierochloe*, and doubtless some other *Gramineae;* 8, 9.

3. **C. schmidiella**, *Fr.* 8-10 mm. Antennae with apex and a broad subapical band white. Abdomen more or less suffused with ochreous. Forewings black; an oblique brassy-metallic fascia towards base; a broad orange fascia beyond middle, narrowed dorsally, edged with black scales and then with narrow violet-golden-metallic fasciae; a bluish-silvery-metallic line along upper part of termen to apex. Hindwings dark grey. A variety occurs in which the orange fascia becomes black.

Sussex, Dorset, local; Germany, Switzerland, N. Persia; 6, 7. Larva pale yellow; dorsal and subdorsal lines and two lateral series of dots crimson; head pale yellow-brown; 2 with two black spots: in whitish blotches in leaves of *Vicia sepium;* 8, 9.

4. **C. eximia**, *Hw.* (*drurella*, Stt., non F.) 8-10 mm. Differs from *C. schmidiella* only as follows: antennae with subapical band much narrower; abdomen dark brassy-fuscous; forewings with apical line reduced to a violet-metallic mark in middle of termen and a white dash in apical cilia.

Middlesex, Essex, local; C. Europe, Asia Minor; 7. Larva whitish; dorsal and subdorsal lines crimson; head and plate of 2 brown: in blotches in leaves of *Humulus;* 8, 9.

6. STATHMOPODA, *Stt.*

Antennae $\frac{3}{4}$, in ♂ with very long fine ciliations, basal joint elongate. Labial palpi very long, recurved, second joint smooth, terminal as long, acute. Posterior tibiae rough-haired. Forewings: 1b furcate, 7 and 8 stalked, 7 to costa. Hindwings

$\frac{1}{2}$, linear-lanceolate, cilia 6; transverse vein partly absent, 6 and 7 connate.

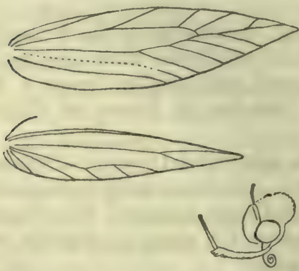
A rather extensive genus, occurring especially in Australia, New Zealand, the Indo-Malayan and African regions; only two species have been found in Europe. Larva feeding in fruits or galls. Pupa in a silken cocoon. Imago with forewings narrow, broadest near base, long-pointed. All the species in repose often carry the posterior legs semierect, projecting between the anterior and middle pairs.

1. **S. pedella**, *L.* 10-14 mm. Forewings ochreous-yellow; costal edge fuscous; three irregular fuscous fasciae at base, $\frac{1}{3}$, and $\frac{2}{3}$, first and second connected by a dorsal streak, second and third not quite reaching costa, connected in disc by a fine longitudinal line; a small fuscous apical spot; cilia fuscous. Hindwings dark grey.

Kent to Norfolk, local; C. Europe; 7. Larva stout, pale reddish-brown; head brown; plate of 2 dark brown: in fruits of alder; 9.

7. ELACHISTA, *Tr.*

Antennae $\frac{3}{4}$, in ♂ simple. Labial palpi long, recurved, second joint smooth, terminal shorter, acute. Posterior tibiae rough-haired. Forewings: 1b simple, 4 sometimes absent, 5 absent, 6 out of 7, 7 to costa, 8 out of 7 or absent, 9 sometimes out of 7. Hindwings $\frac{1}{2}$-$\frac{2}{3}$, narrow-lanceolate, cilia 3-5; 4 sometimes absent, 5 absent, transverse vein sometimes partly absent, 6 and 7 stalked.



Neuration and head of *Elachista rufocinerea.*

A large cosmopolitan genus, apparently most characteristic of Europe. The species are often very similar and difficult to distinguish. Imago with forewings lanceolate. Larva mining in leaves of *Gramineae* or *Cyperaceae.* Pupa usually exposed, fastened by tail and median belt, but sometimes in cocoon.

1. Markings of forewings pale golden-metallic . 2.
,, ,, not golden-metallic . 3.
2. Forewings with thick fascia near base 3. *magnificella.*
,, without subbasal fascia 4. *gleichenella.*

3. Forewings ochreous-yellow . . . 40. *subalbidella.*
,, not yellow . . . . 4.
4. Ground-colour of forewings grey or blackish . 5.
,, ,, whitish . . 30.
5. Forewings with pale central fascia only . . 6.
,, not so marked . . . 10.
6. Head whitish . . . . 25. *megerlella.*
,, dark grey . . . . . 7.
7. Forewings with tips of apical cilia whitish . 8.
,, ,, ,, grey . 21. *taeniatella.*
8. Fascia whitish . . . . 24. *cingillella.*
,, partly or wholly yellowish . . 9.
9. Fascia whitish, posteriorly yellow . 23. *zonariella.*
,, wholly pale yellowish . . 22. *gangabella.*
10. Forewings with white apical spot . 1. *trapeziella.*
,, without white apical spot . . 11.
11. Plical stigma distinct, black . . . 12.
,, ,, absent . . . . 15.
12. Plical stigma followed by a white mark . . 13.
,, ,, not followed by a white mark
20. *consortella.*
13. Tornal pale spot somewhat beyond costal 26. *serricornis.*
,, ,, not beyond costal . . 14.
14. Costal pale spot broad, triangular . 27. *paludum.*
,, ,, narrow, oblique . 29. *eleochariella.*
15. Anterior fascia central, not reaching dorsum
2. *cinereopunctella.*
,, ,, before middle . . . 16.
16. Head yellow . . . . 8. *luticomella.*
,, not yellow . . . . . 17.
17. Forewings with subapical round white dot
5. *apicipunctella.*
,, without subapical white dot . . 18.
18. Head wholly white . . . . 19.
,, not wholly white . . . . 20.
19. Costal spot opposite tornal . . 15. *stabilella.*
,, ,, beyond tornal . 6. *albifrontella.*
20. Costal and tornal spots forming distinct fascia . 21.
,, ,, ,, more or less separate . 22.
21. Posterior fascia irregular, oblique . 11. *kilmunella.*
,, ,, vertical . . . 17. *bedellella.*
22. Costal spot opposite tornal . . . 23.
,, ,, more or less beyond tornal . . 25.

23. Anterior fascia twice shortly angulated . 12. *poae.*
,, not so formed . . . . . 24.
24. Costal spot larger than tornal . . 13. *perplexella.*
,, ,, not larger than tornal . 16. *nigrella.*
25. Costal spot rounded or truncate beneath . 7. *holdenella.*
,, ,, triangular . . . . 26.
26. Costal spot markedly larger than tornal . . 27.
,, ,, not markedly larger than tornal . 28.
27. Anterior fascia almost obsolete . . 18. *humilis.*
,, ,, distinct . . . 9. *atricomella.*
28. Fascia somewhat curved, in ♂ costally obsolete 10. *alpinella.*
,, straight, in ♂ not more obsolete costally 29.
29. Head dark grey, face lighter . . 14 *subnigrella.*
,, grey on crown, face whitish . 19. *obscurella.*
30. Forewings with two or three pale ochreous fasciae 31.
,, without pale ochreous fasciae . . 33.
31. Costa fuscous towards base . . . 32.
,, not fuscous towards base . . 35. *subocellea.*
32. Dark line of cilia truncate at apex . 34. *collitella.*
,, ,, ,, rounded . . 33. *disertella.*
33. Plical stigma absent . . . . 34.
,, ,, black, distinct . . . 35.
34. Forewings irrorated with brown or ochreous 38. *rufocinerea.*
,, wholly white . . 39. *cygnipennella.*
35. Forewings with two dark fuscous fasciae . 32. *cerusella.*
,, without dark fuscous fasciae . . 36.
36. Forewings with grey or fuscous markings . 37.
,, without such markings . . 39.
37. Forewings with angulated fuscous fascia . . 38.
,, without such fascia . . 28. *biatomella.*
38. Forewings with apical black dot . . 31. *scirpi.*
,, without apical black dot 30. *rhynchosporella.*
39. Stigmata dark fuscous, hindwings grey-whitish 36. *dispunctella.*
,, black, hindwings in ♂ grey . 37. *triatomea.*

1. **E. trapeziella,** *Stt.* 8-10 mm. Head grey, face white. Forewings blackish ; a spot on fold towards base, one on middle of costa and another beneath it on fold, in ♀ larger and sometimes confluent, a fourth on tornus, and a fifth at apex shining white. Hindwings dark fuscous.

Kent, Gloucester, York, Lancashire, Durham, local ;

Germany, Switzerland; 6. Larva greenish-grey, faintly reddish-tinged: in leaves of *Luzula pilosa;* 4, 5.

2. **E. cinereopunctella**, *Hw.* 7-9 mm. Head grey, face white. Forewings grey, irrorated with dark fuscous; a central fascia not reaching dorsum, a spot on tornus, and another on costa close before apex whitish; a black apical dot. Hindwings dark grey.

Britain to Caledonian Canal, local; Germany, Switzerland; 5, 6. Larva whitish, sides more yellowish; subdorsal series of red spots; head dark brown; 2 with two brown spots: in leaves of *Carex glauca;* 10-4.

3. **E. magnificella**, *Tgst.* 8-9 mm. Head coppery-fuscous. Antennae with apex in ♀ white. Forewings dark bronzy-fuscous; a thick fascia near base, a central fascia not reaching costa, a transverse tornal spot, and another beyond it on costa pale golden-metallic. Hindwings dark grey.

England to York, local; C. Europe; 7. Larva yellowish; dorsal line green; head pale brown: in leaves of *Luzula pilosa;* 4, 5.

4. **E. gleichenella**, *F.* 7-8 mm. Head bronzy-metallic. Forewings dark bronzy-fuscous; a small basal spot, a fascia before middle, and an outwards-angulated fascia towards apex pale golden-metallic. Hindwings grey.

Britain to Stirling, rather common; C. Europe; 6, 7. Larva whitish, faintly purple-tinged; head dark brown; 2 with two purple-blackish marks: in leaves of *Carex stellulata*, etc.; 10-4.

5. **E. apicipunctella**, *Stt.* 8-10 mm. Head silvery-white. Forewings dark fuscous, bronzy-tinged; base silvery; a somewhat oblique fascia before middle, a tornal spot, a larger triangular spot beyond it on costa, and a subapical dot silvery-white. Hindwings grey.

Middlesex, Norfolk, Cambridge, York to Stirling, local; C. Europe; 6. Larva pale yellow; head brown: in leaves of *Holcus, Festuca, Dactylis*, etc.; 10-4.

6. **E. albifrontella**, *Hb.* 8-10 mm. Head white. Forewings blackish; a somewhat oblique fascia before middle, sometimes interrupted, a tornal spot, and a rather larger triangular costal spot beyond it white. Hindwings dark grey.

Britain to Caledonian Canal, common; C. Europe, Asia Minor; 6. Larva yellow-whitish; head pale brown; 2 with three rows of brown dots: in leaves of *Holcus, Dactylis, Aira*, etc.; 10-5.

7. **E. holdenella**, *Stt.* 8-10 mm. Head grey, face whitish. Forewings blackish, basal area in ♀ grey; a narrow somewhat oblique fascia before middle, a tornal spot, and a larger transverse costal spot beyond it, rounded or truncate beneath, white, more conspicuous in ♀. Hindwings dark grey.

Middlesex (?), Dorset, very local; NW. Germany; 5, 6. Larva in leaves of *Aira caespitosa;* 4.

8. **E. luticomella**, *Z.* (*flavicomella*, Stt.) 9-11 mm. Head light ochreous-yellow, seldom with a fuscous spot. Forewings dark fuscous; a somewhat oblique fascia before middle, a small tornal spot, and another on costa beyond it ochreous-whitish, in ♀ enlarged and more conspicuous. Hindwings blackish-grey.

Britain to the Clyde, E. Ireland, rather common; C. Europe; 6, 7. Larva pale yellow; head pale brown: in leaves and stems of *Dactylis glomerata;* 4, 5. Stainton's *flavicomella* was founded on an abnormal variety, occurring amongst the common form.

9. **E. atricomella**, *Stt.* 9-11 mm. Head blackish, whitish-sprinkled, face in ♀ whitish. Forewings blackish, pale-sprinkled; a somewhat oblique fascia before middle, in ♂ interrupted, a tornal spot, and a larger triangular spot beyond it on costa white. Hindwings dark grey.

Britain to the Clyde, common; Holland, Germany; 6. Larva pale yellowish; head pale brown; 2 with two yellow-brown marks: in leaves and stems of *Dactylis glomerata;* 4, 5.

10. **E. alpinella**, *Stt.* (*monticola*, Wk.) 9-11 mm. Head fuscous, whitish-sprinkled. Forewings dark fuscous, basal area in ♀ sometimes pale; a somewhat curved fascia before middle, in ♂ obsolete towards costa, an erect triangular tornal spot, and a similar spot on costa beyond it white, in ♀ larger. Hindwings dark grey.

Dorset, Suffolk, Lancashire, Banff, on moors, local; Germany, Switzerland; 8. Larva in leaves and stems of *Carex paludosa;* 4-6.

11. **E. kilmunella**, *Stt.* 9-11 mm. Head grey, whitish-sprinkled. Forewings dark grey, basal area in ♀ whitish; a nearly straight fascia before middle, a tornal spot and costal spot beyond it united into a rather irregular fascia whitish, in ♀ clearer; cilia round apex more whitish. Hindwings rather dark grey.

Surrey to Norfolk, Cheshire to Caledonian Canal, on moors, local, commoner northwards; Germany, NW. Russia; 6, 7.

12. **E. poae**, *Stt.* 9-11 mm. Head blackish. Forewings blackish, somewhat pale-sprinkled, basal area somewhat lighter; an obscure fascia before middle, angulated outwards in middle and inwards on fold, a small ill-defined tornal spot, a more distinct one on costa opposite, and traces of an angular mark in disc beyond and connecting these whitish, in ♀ more distinct. Hindwings dark grey.

Kent to Dorset and Norfolk, local; Holland, N. Germany, Finland; 5, 8. Larva whitish-yellowish; head and two spots on 2 pale brown: in leaves of *Poa aquatica;* 4, 7.

13. **E. perplexella**, *Stt.* (*airae*, Stt.) 8-9 mm. Head grey, face in ♂ lighter and submetallic, in ♀ whitish. Forewings blackish, somewhat pale-sprinkled; a somewhat curved fascia before middle, in ♂ sometimes obsolete or interrupted, a small indistinct tornal spot, and a larger opposite costal spot whitish, in ♀ more distinct. Hindwings rather dark grey.

Kent, Hereford, York to the Clyde, E. Ireland, local; C. Europe; 5, 7. Larva dull yellowish; dorsal line whitish; head ochreous-brown: in leaves of *Aira caespitosa;* 4, 6.

14. **E. subnigrella**, *Dgl.* 7-8 mm. Head dark grey, face lighter. Forewings blackish-grey, light-sprinkled, in ♀ darker except on basal area; a slender indistinct fascia before middle, somewhat indented or interrupted on fold, in ♂ sometimes almost obsolete, a small indistinct tornal spot, and costal spot somewhat beyond it whitish, in ♀ whiter and more distinct. Hindwings rather dark grey.

England to Westmoreland, E. Ireland, local; Holland, Germany, Switzerland; 5, 6, 8. Larva pale yellow; head pale brown: in leaves of *Bromus erectus;* 4, 7.

15. **E. stabilella**, *Fr.* 7-8 mm. Head white. Forewings blackish; an oblique fascia before middle, a tornal spot, and a rather outwardly oblique costal spot opposite white. Hindwings rather dark grey.

Surrey to Dorset and Cambridge, York, local; Germany, Switzerland; 5-7. Larva yellowish; head and plate of 2 pale brownish: in leaves of *Aira caespitosa;* 2-5.

16. **E. nigrella**, *Hw.* (*aridella*, Hein.; *pullella*, HS.; *Gregsoni*, Stt.) 7-8 mm. Head dark grey, whitish-sprinkled, face paler or whitish. Forewings blackish, somewhat paler-sprinkled; an oblique fascia before middle, in ♂ indistinct and sometimes interrupted, a tornal spot, and an opposite costal spot (appearing together to form a perpendicular interrupted fascia) whitish, in ♀ whiter and more distinct. Hindwings grey.

Britain to the Clyde, Ireland, common; C. Europe; 5, 6, 8. Larva pale yellowish-grey; head black or pale brown; 2 with two black spots: in leaves of *Poa trivialis*, *P. annua*, etc.; 3, 4, 7.

17. **E. bedellella**, *Sirc.* 7-8 mm. Head grey, whitish-mixed, face whitish. Forewings grey, darker-sprinkled, in ♀ paler, more whitish towards base; a hardly oblique whitish fascia before middle, and a vertical one about $\frac{3}{4}$; dark line of cilia almost straight, vertical, causing a truncate appearance. Hindwings rather dark grey.

England to Durham, on downs, common; Germany, Switzerland; 5, 8. Larva greyish-green, sometimes reddish-tinged; head pale brown; 2 with two brown spots: in leaves of *Avena pratensis*; 4, 7.

18. **E. humilis**, *Z.* (*occultella*, Dgl.) 8-9 mm. Head grey, face whitish. Forewings light grey irrorated with dark fuscous; a very indistinct oblique whitish fascia before middle, usually partly or wholly obsolete; a small tornal spot and larger triangular spot on costa somewhat beyond it ochreous-white. Hindwings grey.

England to Westmoreland, local; N. and C. Europe; 5.

19. **E. obscurella**, *Stt.* (*pulchella*, Hw.; *subobscurella*, Dbld.) 7-9 mm. Head grey, face whitish. Forewings in ♂ pale grey irrorated with black, in ♀ blackish except on basal area; a somewhat oblique fascia before middle, a tornal spot, and triangular costal spot somewhat beyond it in ♂ very indistinct, whitish, almost obsolete, in ♀ broader, white, conspicuous. Hindwings grey.

Britain to the Clyde, very common; C. Europe; 5, 8. Larva pale yellowish-grey; head pale brown: in leaves of *Holcus*, etc.; 3, 4, 7.

20. **E. consortella**, *Stt.* 6-7 mm. Head grey, face whitish. Forewings blackish-grey, somewhat paler-sprinkled; a somewhat oblique fascia before middle, in ♂ reduced to a spot on fold, a tornal spot, another on costa opposite, and a more or less developed angular mark beyond and connecting these whitish, in ♀ more distinct; plical stigma elongate, black. Hindwings rather dark grey.

Westmoreland to the Clyde, E. Ireland, local; not recognised elsewhere; 3, 4.

21. **E. taeniatella**, *Stt.* 9-10 mm. Head dark grey. Forewings blackish; a straight perpendicular central light yellowish fascia, in ♂ narrowed towards costa; cilia wholly grey. Hindwings dark grey.

England to Durham, E. Ireland, local; Germany, Switzerland; 5, 6. Larva rather dark grey, speckled with darker; head and 2 light reddish-ochreous: in leaves of *Brachypodium sylvaticum;* 9-11.

22. **E. gangabella,** *Z.* 8-10 mm. Head blackish-grey. Forewings blackish; a straight somewhat inwardly oblique central whitish-yellowish fascia, in ♂ narrowed towards costa; tips of apical cilia whitish. Hindwings dark grey.

England to Durham, rather common; C. Europe; 5, 6. Larva grey-green, yellowish-tinged; head yellow-brown; 2 with two pale brown spots: in leaves of *Dactylis glomerata* and *Holcus;* 10-4.

23. **E. zonariella,** *Tgst.* 7-9 mm. Head dark grey, face whitish. Forewings dark fuscous, blackish-sprinkled; a hardly curved whitish central fascia, edged with yellow posteriorly, broader towards dorsum; tips of apical cilia whitish. Hindwings dark grey.

Britain to Caledonian Canal, E. Ireland, rather common; C. Europe, Asia Minor; 5, 7, 8. Larva grey-green; head pale brown; 2 with two brown spots: in leaves of *Aira caespitosa;* 4, 6.

24. **E. cingillella,** *HS.* 7-8 mm. Head dark grey, face lighter. Forewings blackish-grey; a nearly straight slender central whitish fascia; tips of apical cilia whitish. Hindwings dark grey.

Kent, Derby, local; SC. Europe, Asia Minor; 6.

25. **E. megerlella,** *Stt.* (*cinctella,* Z.; *adscitella,* Stt.; *obliquella,* Stt.) 8-11 mm. Head ochreous-whitish. Antennae whitish-ringed. Forewings light grey, irrorated with blackish; a nearly straight central whitish fascia, sometimes ochreous-tinged, in ♂ slenderer and sometimes interrupted; tips of apical cilia whitish. Hindwings grey.

England, E. Ireland, common; N. and C. Europe; 5, 6, 8. Larva grey-greenish; head pale brown; 2 with two brown spots: in leaves of *Brachypodium, Bromus, Aira, Sesleria,* etc.; 11-4, 7.

26. **E. serricornis,** *Stt.* 7-8 mm. Head grey, face whitish. Forewings in ♂ grey, in ♀ blackish-grey; plical stigma black, elongate, followed by a white dot; an oblique white triangular costal spot at $\frac{2}{3}$; a small indistinct whitish tornal spot somewhat beyond it. Hindwings grey.

Kent, Dorset, Lancashire to the Clyde, local; Germany, Switzerland; 6, 7.

27. **E. paludum,** *Fr.* 8-9 mm. Head in ♂ grey, in ♀ whitish. Forewings rather dark fuscous or ochreous-grey, pale-sprinkled, lighter in ♀; plical stigma elongate, black, preceded and followed by whitish marks; a small tornal spot, and larger triangular anteriorly dark-edged opposite costal spot white. Hindwings dark grey.

Dorset, Berks, Suffolk, Norfolk, Durham, local; Holland, Germany; 5, 6. Larva grey; head brown; 2 pale yellowish, with two brown spots: in leaves of *Carex paludosa* and *C. paniculata;* 4, 5.

28. **E. biatomella,** *Stt.* 7-8 mm. Head pale grey, face whitish. Forewings ochreous-whitish, irrorated with grey; plical and second discal stigmata elongate, black, plical preceded and followed by whitish marks; in darker specimens an oblique triangular white spot is visible on costa at $\frac{2}{3}$, in paler specimens it is obsolete. Hindwings grey.

England, rather common; Holland, Switzerland; 5, 6, 8. Larva yellowish; head brown; 2 with two pale brown spots: in leaves of *Carex glauca;* 4, 7.

29. **E. eleochariella,** *Stt.* 7-8 mm. Head grey. Forewings grey; plical stigma black, preceded and followed by whitish marks; a small tornal spot, and an oblique wedge-shaped mark on costa opposite whitish. Hindwings dark grey.

Cambridge, York to the Clyde, local; Germany (?); 6, 7. Larva in leaves of *Eriophorum* and *Carex;* 5.

30. **E. rhynchosporella,** *Stt.* 9-10 mm. Head white. Forewings white, costa and sometimes dorsum suffused with fuscous; plical stigma large, elongate, black; an angulated fuscous fascia beyond middle, angle acutely produced towards apex; small fuscous costal and dorsal spots near apex. Hindwings rather dark grey.

England, local; C. Europe; 6, 7. Larva greenish-grey, more yellowish anteriorly; head dark brown: in leaves of *Eriophorum* and *Carex;* 5.

31. **E. scirpi,** *Stt.* 9-12 mm. Head grey-whitish. Forewings as in *E. rhynchosporella,* but fuscous markings more undefined, apex of fascia not distinctly produced, a distinct minute black apical dot. Hindwings rather dark grey.

S. England to Norfolk and Pembroke, in salt-marshes, local; not recognised elsewhere; 6, 7. Larva pale greenish-yellow; dorsal line indistinct; head pale yellow: in short broad galleries in leaves of *Scirpus maritimus* and *Juncus compressus;* 4, 5.

32. **E. cerusella,** *Hb.* 9-10 mm. Head whitish. Forewings

ochreous-whitish; sometimes two or three dark fuscous spots near base; cloudy dark fuscous fasciae in middle and at ¾, sometimes obsolete towards costa, anterior including black plical stigma. Hindwings grey.

England, rather local; C. Europe, Asia Minor; 5, 8. Larva pale yellow; head brown; 2 with two faint brown spots: in blotches in leaves of *Phragmites communis;* 4, 7.

33. **E. disertella**, *HS.* (*pollinariella*, Stt., non Z.) 8-10 mm. Head ochreous-whitish. Forewings whitish; three broad whitish-ochreous fasciae near base, in middle, and at ¾, with some irregularly scattered black scales, first two fasciae more or less fuscous on costa; dark line of cilia rounded. Hindwings grey.

England to Durham, E. Ireland, rather common; C. and S. Europe, Asia Minor, N. Africa; 6, 7. Larva whitish-grey; head brown; 2 with two blackish marks: in leaves of *Brachypodium sylvaticum;* 5.

34. **E. collitella**, *Dup.* 8-9 mm. Head whitish. Forewings whitish; costa towards base fuscous, with traces of a basal fascia; two broad partially ill-defined light yellow-ochreous fasciae in middle and at ¾, more or less fuscous on costa, with some scattered black scales; dark line of cilia appearing truncate at apex. Hindwings grey.

Pembroke, local; C. Europe; 6, 7.

35. **E. subocellea**, *Stph.* (*collitella*, Stt., non Dup.) 8-9 mm. Differs from *E. collitella* as follows: forewings whiter, costa not distinctly fuscous towards base, plical and second discal stigmata sometimes distinct, black.

England to York, E. Ireland, local; Germany; 6, 7.

36. **E. dispunctella**, *Dup.* (*triseriatella*, Stt.) 7-9 mm. Head white. Forewings white, faintly ochreous-tinged, with scattered black scales; plical and second discal stigmata dark fuscous, sometimes indistinct. Hindwings grey-whitish.

England to Westmoreland, E. Ireland, local; C. Europe; 6, 7. Larva greyish-ochreous: in leaves of *Festuca ovina* and *F. duriuscula;* 9-5.

37. **E. triatomea**, *Hw.* 8-10 mm. Head white. Forewings white, with some scattered fuscous scales, especially posteriorly; plical and second discal stigmata black, distinct. Hindwings in ♂ grey, in ♀ grey-whitish.

Britain to the Clyde, rather common; Germany; 6, 7.

38. **E. rufocinerea**, *Hw.* 9-11 mm. Head whitish. Forewings white, in ♂ densely irrorated with brown, in ♀ more

thinly with ochreous. Hindwings in ♂ dark grey, in ♀ grey.

Britain to the Clyde, N. and E. Ireland, abundant; Holland, SC. Europe, Asia Minor; 4, 5. Larva pale yellowish; dorsal vessel dark grey; head and two spots on 2 brown: in leaves of *Holcus mollis;* 12-3.

39. **E. cygnipennella**, *Hb.* (? *argentella*, Cl.) 10-13 mm. Head white. Forewings white, sometimes ochreous-tinged. Hindwings in ♂ grey, in ♀ grey-whitish.

Britain to Argyll, Ireland, very common; C. and S. Europe, N. Africa; 5, 6. Larva greenish-grey; dorsal line whitish; head pale brown: in leaves of *Dactylis*, *Bromus*, etc.; 4.

40. **E. subalbidella**, *Schl.* (*ochreella*, Stt.; *subochreella*, Dbld.) 8-12 mm. Head ochreous-yellowish. Forewings ochreous-yellow, towards costa sometimes fuscous-tinged. Hindwings dark grey.

Kent to Dorset, Cheshire and York to Westmoreland, local; C. Europe; 6.

8. Stephensia, *Stt.*

Antennae $\frac{3}{4}$, in ♂ simple. Labial palpi short, drooping, filiform, pointed. Posterior tibiae loosely haired. Forewings: 1b simple, 5 and 6 out of 7, 7 to costa, 8 absent. Hindwings $\frac{2}{3}$, lanceolate, cilia over 2; 5 absent, 6 and 7 approximated.

Includes only the one species; correlated with the preceding genus. Imago with forewings lanceolate.

1. **S. brunnichiella**, *L.* 7-8 mm. Head dark bronzy. Antennae with white subapical band. Forewings dark bronzy-fuscous; a subbasal fascia, another before middle, an erect tornal spot, and a costal spot before apex pale golden-metallic. Hindwings dark grey.

England to Durham, rather local; C. and S. Europe, Asia Minor; 5, 8. Larva green-whitish; dorsal line dark green; head and plate of 2 blackish: in blotches in leaves of *Calamintha clinopodium;* 4, 7.

9. Limnoecia, *Stt.*

Antennae $\frac{3}{4}$, in ♂ shortly ciliated, basal joint very long. Labial palpi very long, recurved, second joint thickened with smooth scales, terminal longer, acute. Posterior tibiae rough-haired. Forewings: 1b furcate, 7 and 8 stalked, 7 to costa. Hindwings $\frac{2}{3}$, elongate-lanceolate, cilia 2; all veins separate.

The single species has been much overlooked, being very retired in the perfect state, but probably occurs throughout the Old World. Imago with forewings very elongate, long-pointed. Its colouring, like that of so many swamp-frequenting species, is assimilated to the dead reeds.

1. **L. phragmitella**, *Stt.* 17-21 mm. Forewings pale brownish-ochreous, veins posteriorly more or less whitish, with some fuscous scales between them; discal stigmata dark fuscous, partly whitish-edged and connected by a whitish streak; a streak from second to apex often more infuscated; dark fuscous marginal dots towards apex. Hindwings light grey, ochreous-tinged.

England to York, common; C. and S. Europe, N. Africa, Australia, New Zealand; 7. Larva yellow-whitish; dorsal line brownish; subdorsal and lateral light fuscous; head brown: in heads of *Typha*, causing the down to hang out in large conspicuous masses; 9-5. The wide distribution of this species is apparently natural, and probably due to transportation of the *Typha*-down by the wind.

10. ANYBIA, *Stt.*

Antennae $\frac{4}{5}$, in ♂ simple, basal joint elongate. Labial palpi long, recurved, second joint somewhat rough beneath, terminal as long, acute. Posterior tibiae rough-haired. Forewings: 1b furcate, 7 and 8 stalked, 7 to costa. Hindwings $\frac{1}{2}$, lanceolate, cilia 4; all veins separate.

Only one species is known; a development of *Mompha*. Imago with forewings lanceolate.

1. **A. epilobiella**, *Roem.* (*langiella*, Hb.) 9-10 mm. Head dark fuscous, face silvery. Palpi white, terminal joint black. Forewings dark purplish-bronzy-fuscous; a transverse white spot in disc beyond middle; some whitish scales towards dorsum before this, and sometimes in disc towards apex. Hindwings dark grey.

SW. England to Dorset and Worcester, Herts, Westmoreland, Cumberland, local; C. Europe; 8-4. Larva pale yellow; dorsal vessel dark green; head black-brown; plate of 2 black: in flat blotches in leaves of *Epilobium hirsutum* and *Circaea lutetiana;* 7.

11. HELIODINES, *Stt.*

Antennae $\frac{4}{5}$, in ♂ thick, simple. Labial palpi rather short, slightly curved, porrected, filiform, pointed. Posterior tibiae smooth-scaled. Forewings: 1b simple, 6 and 7 stalked, 7 to costa, 8 absent. Hindwings ½, lanceolate, cilia 3; transverse vein partly absent, 4 absent, 6 and 7 approximated.

There is only one known species. Imago with forewings lanceolate.

1. **H. roesella**, *L.* 10-11 mm. Head and thorax metallic dark bronzy-fuscous. Forewings deep orange, margins narrowly blackish; an oblique mark from base of costa, a narrow fascia at ⅓, three posterior costal spots, a triangular tornal spot, and small subapical spot leaden-metallic, black-edged. Hindwings dark fuscous.

Said to have been formerly taken near London, record probably authentic; C. Europe, WC. Asia to Turkestan; 7, 8. Larva pale green; dorsal line darker; head black; 2 with two black spots: amongst spun leaves of *Atriplex* and *Chenopodium;* 6.

12. PANCALIA, *Curt.*

Antennae $\frac{4}{5}$, in ♂ rather thick, very shortly ciliated, basal joint rather long. Labial palpi very long, recurved, second joint somewhat loosely scaled beneath, terminal shorter, acute. Posterior tibiae rough-haired. Forewings with scale-tufts on surface: 1b furcate, 7 and 8 stalked, 7 to costa. Hindwings almost 1, lanceolate, cilia 2; 6 absent.

It is probable that the three supposed different forms of this genus constitute only one species. Imago with forewings elongate-lanceolate.

1. **P. leuwenhoekella**, *L.* (*latreillella*, Curt.) 9-13 mm. Head and thorax dark bronzy-metallic. Antennae usually with white subapical band. Forewings deep orange, margins more or less blackish; a narrow interrupted fascia at ¼, a costal spot before middle and another inwardly oblique at ¾, a dorsal median spot, and an erect tornal mark pale golden-metallic, blackish-edged; a whitish spot in cilia on posterior costal spot. Hindwings rather dark bronzy-fuscous.

Britain to the Clyde, somewhat local; Europe, Asia Minor; 5, 6. Larva dull purple-reddish, segmental incisions and wrinkles pale brownish-ochreous; head pale yellowish-brown, darker-marked; plate of 2 transparent: in leaf-stalks, afterwards in silken galleries amongst rootstock of *Viola hirta;* 6-8. The imago flies in afternoon sunshine.

13. CHRYSOCLISTA, *Stt.*

Antennae $\frac{4}{5}$ to almost 1, in ♂ simple. Labial palpi long, recurved, second joint loosely scaled beneath towards apex, terminal shorter, acute. Posterior tibiae rough-haired. Forewings with scale-tufts on surface; 1b furcate, 5 absent, 7 and 8 stalked or coincident, 7 to costa. Hindwings $\frac{2}{3}$, lanceolate, cilia 3-4; 5 and 6 or 6 and 7 sometimes stalked, transverse vein sometimes partly absent.

A small genus, at present not satisfactorily identified outside the European region. Imago with forewings elongate-lanceolate. Larva feeding in bark, fruit, or shoots of trees or shrubs.

1. Forewings partly orange . . . . 2.
„ not orange . . . . 3.
2. Costa broadly black to about middle . 1. *bimaculella.*
„ only black at base . . . 2. *linneella.*
3. Head orange-yellow . . 3. *aurifrontella.*
„ not yellow . . . . . 4.
4. Head white . . . . 5. *atra.*
„ not white . . . . . 5.
5. Forewings with four large scale-tufts . 6. *rhamniella.*
„ „ two scale-tufts . . 4. *vinolentella.*

1. **C. bimaculella**, *Hw.* 10-12 mm. Head and thorax metallic brassy-black. Antennae with apex white. Forewings bronzy-blackish; an elongate orange blotch towards base below middle; a large orange blotch occupying apical half of wing except margins, extending to costa at $\frac{3}{4}$; silvery-metallic scale-tufts above dorsum before middle, below middle of costa, and beyond tornus. Hindwings dark bronzy-fuscous.

England to Westmoreland, scarce and local; Germany, Austria; 6, 7.

2. **C. linneella**, *Cl.* 10-13 mm. Head and thorax metallic brassy-black. Antennae with apex white. Forewings bright orange; base black, emitting a fine silvery-metallic costal streak to $\frac{1}{3}$, and a shorter projection in disc; dorsum slenderly, termen and apical $\frac{1}{3}$ of costa more broadly bronzy-blackish; a silvery-metallic scale-tuft above dorsum before middle, another below middle of costa, and a third beyond tornus; a silvery-metallic costal dash about $\frac{3}{4}$. Hindwings dark bronzy-fuscous.

Kent, Middlesex, Gloucester, N. Ireland, very local but common where it occurs; C. Europe, Asia Minor; 7, 8. Larva yellow-whitish; head pale brown: in bark of *Tilia*, especially in towns; 10-5. The imago rests on the trunks.

3. **C. aurifrontella**, *Hb.* (*flavicaput*, Hw.) 11-14 mm. Head orange-yellow. Palpi yellow, basal half blackish, terminal joint very short. Forewings purplish-black; plical and second discal stigmata black, raised. Hindwings dark fuscous.

England, E. Ireland, common; C. Europe; 6. Larva slender, whitish: in twigs of hawthorn; 8-10.

4. **C. vinolentella**, *HS.* 9-11 mm. Head blackish. Forewings narrow, blackish; plical and second discal scale-tufts black, latter anteriorly finely whitish-margined; some white scales towards costa posteriorly and apex. Hindwings dark grey.

England to Lancashire, local and uncommon; Germany; 7. Larva in shoots of apple; 4.

5. **C. atra**, *Hw.* (*hellerella*, Dup.) 11-13 mm. Head white. Forewings narrow, dark fuscous; a broad white dorsal streak, sprinkled with dark fuscous, from base to tornus, with broad triangular indentation at $\frac{2}{5}$, including a black scale-tuft; from apex of this streak a slender whitish fascia to costa before apex, emitting a branch posteriorly in middle and sometimes one anteriorly below it; a black scale-tuft in disc before this. Hindwings grey.

England to York, E. Ireland, local; Holland, Germany, Italy; 6, 7. Larva in berries of hawthorn; 9, 10.

6. **C. rhamniella**, *Z.* 9-11 mm. Head fuscous, whitish-sprinkled. Forewings fuscous, sometimes somewhat ochreous-mixed; large blackish scale-tufts on fold at $\frac{1}{4}$, on dorsum before tornus, below middle of costa, and in disc at $\frac{3}{4}$; some raised black strigulae towards apex. Hindwings grey.

E. England to Sussex and Westmoreland, local; C. Europe; 6, 7. Larva greenish; head and plate of 2 black: in shoots and afterwards in rolled leaves of *Rhamnus;* 5, 6.

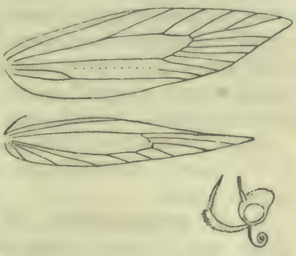
14. MOMPHA, *Hb.*

Antennae $\frac{4}{5}$, in ♂ often thick, simple or shortly ciliated, basal joint rather long. Labial palpi long, recurved, second joint loosely scaled beneath towards apex, terminal shorter or longer, sometimes loosely scaled, acute. Posterior tibiae rough-haired. Forewings with scale-tufts on surface: 1b furcate, 7 and 8 stalked, 7 to costa. Hindwings $\frac{1}{2}$-$\frac{2}{3}$, lanceolate, cilia $2\frac{1}{2}$-4; 5 and 6 sometimes stalked, 7 approximated, transverse vein sometimes partly absent.

There are but few additional European species besides those found in Britain, and the further geographical extension of the genus is doubtful. A closely allied and very similar genus attains some development in Australia. Imago with forewings elongate-lanceolate. The larvae all feed on low plants, almost all on species of *Onagraceae* (*Epilobium* and *Circaea*).

1. Head metallic . . . . . 2.
,, not metallic . . . . 4.
2. Stigmata distinct, silver-metallic . . 1. *terminella.*
,, not distinct . . . . 3.
3. Forewings with metallic dorsal mark before tornus 2. *schrankella.*
,, without such mark . . 3. *raschkiella.*
4. Forewings ochreous or yellow . . . 5.
,, not ochreous or yellow . . 6.
5. Hindwings dark grey . . . 9. *fulvescens.*
,, whitish-yellowish . . 10. *ochraceella.*
6. Forewings white . . . . 12. *Stephensi.*
,, dark fuscous or grey . . . 7.
7. Head whitish-ochreous or ochreous-white . . 8.
,, grey or dark fuscous on crown . . 9.
8. Thorax and basal blotch ochreous-white 5. *propinquella.*
,, ,, ,, pale ferruginous-ochreous 6. *lacteella.*
9. Forewings with whitish fascia before middle 8. *subbistrigella.*
,, without whitish fascia before middle . 10.
10. Forewings with broad white dorsal streak 7. *decorella.*
,, without such streak . . . 11.
11. Forewings with white tornal spot 4. *conturbatella.*
,, without white tornal spot . 11. *miscella.*

1. **M. terminella,** *Westw.* 8-9 mm. Head dark leaden-metallic, face silvery. Antennae with apex white. Forewings orange, sometimes suffused with purple-brown; a black blotch on base of costa, margined with silver-metallic spots; stigmata and a spot above tornus silver-metallic, black-edged, first discal whiter; apex black, preceded on costa by a white spot and on termen by a silver-metallic mark. Hindwings dark fuscous.



Neuration and head of *Mompha fulvescens.*

England to York, local; Germany; 6. Larva whitish; dorsal line green; head yellowish-brown: in irregular (at first spiral) blotches in leaves of *Circaea lutetiana;* 8, 9. The imago is seldom observed at large.

2. **M. schrankella**, *Hb.* 11-12 mm. Head dark leaden-metallic. Antennae with apex in ♀ white. Forewings orange, sometimes suffused with purple-brown; a black basal blotch, extended on costa, where it is preceded and followed by leaden-metallic spots, posterior often connected with a leaden-metallic black-edged spot beyond it on dorsum; a wedge-shaped mark along middle of costa, and an oblique mark from dorsum before tornus leaden-metallic, black-edged; a blackish apical patch, preceded by a whitish costal spot. Hindwings dark fuscous.

Dorset, York to Caledonian Canal, N. Ireland, local; C. Europe; 6, 8. Larva greyish-green; head and plate of 2 black: in blotches in leaves of *Epilobium alsinifolium;* 5, 7.

3. **M. raschkiella**, *Z.* 8-10 mm. Head leaden-metallic, face silvery. Forewings dark fuscous; an orange-yellow dorsal spot towards base, followed by an oblique leaden-metallic fascia, beyond which is a black scale-tuft on fold; a leaden-metallic spot on middle of costa; a double orange spot in disc posteriorly, divided by a leaden-metallic spot beneath, and connected above with a white costal spot. Hindwings dark fuscous.

Surrey, Gloucester, Hereford, local; C. Europe; 6, 8. Larva deep yellow, sides more orange; dorsal line green; head dark brown: in blotches in leaves of *Epilobium angustifolium;* 5, 7.

4. **M. conturbatella**, *Hb.* 15-16 mm. Head dark fuscous, face whitish. Forewings dark fuscous, with several small scattered dull orange-ferruginous spots; an obscure whitish spot on base of dorsum; an oblique fascia before middle, a sometimes incomplete fascia in middle, a spot in disc posteriorly, another beyond tornus, and apical dot bluish-leaden-metallic; three black scale-tufts towards dorsum, and three less marked above them; a small white tornal spot, and large white costal spot beyond it. Hindwings rather dark fuscous.

Surrey, Hereford, York, Lancashire, local; N. and C. Europe; 6, 7. Larva blackish: in spun shoots of *Epilobium angustifolium;* 5, 6.

5. **M. propinquella**, *Stt.* (*paludicolella*, Dbld.) 10-12 mm. Head and thorax ochreous-white. Forewings dark leaden-fuscous, with several small scattered orange-ferruginous spots on dorsal half; an ochreous-white triangular blotch on base of dorsum, almost touching costa at base; one or two white dots beyond this; three black scale-tufts towards dorsum, and three others above them; a white and ferruginous line from costa before middle running round central tuft; a small white

tornal spot and larger costal spot beyond it, disc near them suffused with ferruginous. Hindwings dark fuscous.

Britain to the Clyde, local; Finland, Alps of Switzerland; 6, 7. Larva brown, marbled with pale; head and plate of 2 black: in blotches in leaves of *Epilobium hirsutum;* 2-4. Cocoon within the mine.

6. **M. lacteella**, *Stph.* 9-11 mm. Head whitish-ochreous. Thorax pale ferruginous-ochreous, anteriorly sprinkled with dark fuscous. Forewings as in *M. propinquella*, but blotch at base of dorsum pale ferruginous-ochreous. Hindwings dark fuscous.

England, not uncommon; C. Europe, Asia Minor; 6, 7. Larva in blotches in leaves of *Epilobium hirsutum;* 8.

7. **M. decorella**, *Stph.* 10-11 mm. Head grey, face whitish. Forewings dark fuscous, in disc posteriorly mixed with light ferruginous-ochreous; a broad white dorsal streak from base to near tornus, upper edge indented about its middle by a black scale-tuft; an inwardly oblique white fascia towards apex, sometimes narrowly interrupted. Hindwings grey.

England to Westmoreland, rather common; C. Europe, WC. Asia to Turkestan; 8-5. Larva whitish-green; head blackish; plate of 2 black-brown: in swellings in stems of *Epilobium montanum, E. palustre,* etc.; 6, 7.

8. **M. subbistrigella**, *Hw.* 10-11 mm. Head grey, face whitish. Forewings dark fuscous, in disc posteriorly mixed with light ferruginous-ochreous; an ochreous-whitish blotch on base of dorsum, almost reaching costa at base; a whitish fascia before middle, narrow on costa and broadly dilated downwards; two blackish scale-tufts on fold before and beyond this; an inwardly oblique white fascia towards apex, sometimes narrowly interrupted. Hindwings grey.

S. England to Norfolk and Hereford, rather common; C. and SE. Europe, Asia Minor, N. America; 9-5. Larva deep red, incisions paler or yellow-whitish; head pale yellow-brown: in seedpods of *Epilobium montanum;* 7, 8.

9. **M. fulvescens**, *Hw.* (*epilobiella*, Schrk.) 11-12 mm. Head whitish-ochreous. Forewings light brownish-ochreous; obscure fuscous spots on costa and dorsum before and beyond middle and towards apex, sometimes separated by more or less distinct pale spots; two fuscous scale-tufts on fold. Hindwings dark grey.

England, E. Ireland, abundant; C. Europe; 8-5. Larva pale yellowish; head and plate of 2 black: in spun shoots of *Epilobium hirsutum;* 7.

10. **M. ochraceella**, *Curt.* 15-16 mm. Head whitish-yellow-

ochreous. Forewings yellow, suffusedly and irregularly irrorated with pale ferruginous; three darker scale-tufts above dorsum. Hindwings whitish-yellowish.

Dorset, Norfolk and Cambridge to Durham, local; Holland, Switzerland, Austria; 6, 7. Larva pale yellowish; head pale brown: in stems and roots of *Epilobium hirsutum;* 3-5.

11. **M. miscella,** *Schiff.* (*Staintoni,* Sirc.) 7-9 mm. Head dark grey, face whitish. Forewings dark grey, partly ferruginous-tinged; a black scale-tuft in disc towards base, followed by a white dot; two oblique blackish fasciae before and beyond middle, forming large scale-tufts near dorsum, on costa separated by a whitish spot, second interrupted; a white costal spot at $\frac{4}{5}$; some black scales towards apex. Hindwings grey.

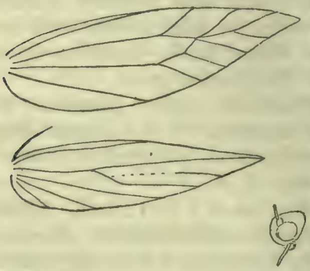
England, common; C. and SE. Europe, Asia Minor; 5, 6, 8. Larva reddish, whitish-marbled; head and plate of 2 black: in blotches in leaves of *Helianthemum;* 3, 4, 7.

12. **M. Stephensi,** *Stt.* 8-10 mm. Head white. Forewings white; three thick oblique dark fuscous streaks from costa, first from base to middle of disc, second from beyond middle, third apical, first and second terminating in large blackish scale-tufts above dorsum, second and third united in disc by a ferruginous streak. Hindwings grey.

Essex, York, in woods, local; Germany; 8.

15. Heliozela, *HS.*

Antennae $\frac{2}{3}$, in ♂ thick, simple. Labial palpi very short, drooping, filiform, pointed. Posterior tibiae loosely haired. Forewings: 1b simple, 5 absent, 6 and 7 stalked, 7 to costa, 8 absent, 9 absent, 10 sometimes out of 7 near base. Hindwings $\frac{3}{4}$, lanceolate, cilia 2; 2 absent, transverse vein absent between 3 and 4, 6 absent.



Neuration and head of *Heliozela stanneella.*

A small but probably nearly cosmopolitan genus, nearly correlated to *Antispila.* Imago with forewings broad-lanceolate. Larva almost apodal, mining in petioles, leaves, or twigs of trees, often hard to detect. Pupa in an oval case cut out from the leaf. The imagos fly in the sunshine. The species are very similar and perhaps not all truly distinct.

1. Forewings grey, spots whitish . . . 2.
„ dark grey, spots white . . 3.
2. Hindwings not reddish-tinged . . 1. *sericiella.*
„ distinctly tinged with purple-reddish 2. *stanneella.*
3. Forewings with termen less oblique . 4. *betulae.*
„ „ more oblique . 3. *resplendella.*

1. **H. sericiella**, *Hw.* 6-8 mm. Head dark bronzy. Forewings bronzy-grey; a small indistinct whitish spot on dorsum towards base, and a larger distinct one beyond middle. Hindwings grey.

England, common; C. Europe, Sicily; 5. Larva in petioles of oak; 6, 7.

2. **H. stanneella**, *F.R.* 6-7 mm. Head dark bronzy. Forewings bronzy-grey; a whitish dorsal spot somewhat beyond middle; sometimes also a smaller indistinct one towards base. Hindwings grey, tinged with purple-reddish.

England to Westmoreland, local; C. Europe; 5. Larva whitish-yellow; head brown; 2 with two black spots: in petioles of oak; 6, 7.

3. **H. resplendella**, *Stt.* 5-7 mm. Head dark bronzy. Forewings dark greyish-bronze; a white dorsal spot towards base, and another beyond middle. Hindwings rather dark brassy-grey.

Britain to Caledonian Canal, common; C. Europe; 6. Larva yellowish-green; head brown; 2 purplish-brown: in midrib of leaves of alder; 7-9.

4. **H. betulae**, *Stt.* (? *hammoniella*, Sorhagen). Differs from *H. resplendella* as follows: forewings less bronzy-tinged, termen less oblique.

Dorset, Hereford, Norfolk, local; Germany; 5, 6. Larva whitish; head pale brown; 2 grey on sides: in twigs and ultimately petioles of birch; 7.

16. ANTISPILA, *Hb.*

Antennae $\frac{2}{3}$, in ♂ thick, simple. Labial palpi short, drooping, filiform, pointed. Posterior tibiae smooth. Forewings: 1b simple, 3 absent, 5 absent, 6 and 7 stalked, 7 to costa, 8 absent, 9 sometimes out of 7 near base. Hindwings $\frac{3}{4}$, lanceolate, cilia 2; 2 sometimes absent, transverse vein absent between 3 and 4, 5 and 7 stalked, 6 absent or out of 7 near apex.

A small genus of three European and several North American species. Imago with forewings lanceolate. Larva almost apodal, mining in leaves. Pupa in an oval case cut out from the leaf. The imagos fly in sunshine.

Posterior costal spot triangular . . 1. *pfeifferella.*
,, ,, transverse-oblong . 2. *treitschkiella.*

1. **A. pfeifferella,** *Hb.* 8-9 mm. Head dark bronzy-fuscous. Forewings dark coppery-bronzy-fuscous; a slender fascia before middle, a triangular tornal spot, and a triangular costal spot beyond it pale golden-metallic. Hindwings dark grey.

England to York, common; C. Europe, Asia Minor; 5. Larva very pale greyish-green; head and plate of 2 pale brown: in blotches in leaves of *Cornus;* 7, 8. Pupal change in autumn; case subterranean.

2. **A. treitschkiella,** *F.R.* 6 mm. Differs from *A. pfeifferella* as follows: forewings with markings yellower-tinged, costal spot more transverse-oblong, not triangular.

England to York, local; C. Europe; 6. Larva grey-whitish; head and plate of 2 black; 3-12 beneath each with a black dot: in blotches in leaves of *Cornus;* 8, 9. Pupal change in spring; case on surface of ground.

17. AUGASMA, *HS.*

Antennae $\frac{3}{4}$, in ♂ thick, simple. Labial palpi short, drooping, filiform, pointed. Posterior tibiae rough-haired. Forewings: 1b furcate, 3 absent, 5 absent, 6 and 7 stalked, 7 to costa, 8 absent. Hindwings $\frac{1}{2}$, lanceolate, cilia 3; transverse vein partly absent, 4 absent, 6 absent.

Only the one species is known; its exact affinities are obscure. The larva is remarkable as being a true gall-producer. Imago with forewings elongate-lanceolate, costa notably subconcave.

1. **A. aeratellum,** *Z.* 9-10 mm. Forewings dark bronzy, with coppery reflections. Hindwings rather dark fuscous.

Kent, Surrey, Essex, local; Germany, Austria, Italy, Asia Minor; 6, 7. Larva pale yellowish; head and two spots of 2 pale brown: in small podlike galls amongst flowers of *Polygonum aviculare;* 9-4. The galls are produced by the action of the larvae themselves, and are not the work of other insects.

18. DOUGLASIA, *Stt.*

Antennae $\frac{4}{5}$, in ♂ simple. Labial palpi short, porrected, tolerably filiform, pointed. Posterior tibiae rough-haired. Forewings: 1b furcate, 5 absent, 6 and 7 stalked, 7 to costa.

Hindwings $\frac{1}{2}$, narrow-lanceolate, cilia 4; transverse vein partly absent, 3 absent, 5 and 6 stalked.

There is only one known species. Imago with forewings elongate-lanceolate.

1. **D. ocnerostomella**, *Stt.* 8-10 mm. Forewings rather dark grey, irrorated with pale; sometimes a faint pale dorsal spot before tornus; cilia with lines of blackish points. Hindwings grey.

Kent and Sussex to Norfolk, E. Ireland, local; Holland, Germany, Asia Minor; 7. Larva in stems of *Echium;* 9, 10. Pupa within the stem.

19. Perittia, *Stt.*

Antennae $\frac{4}{5}$, in ♂ simple. Labial palpi rather short, drooping, filiform, pointed. Posterior tibiae rough-haired. Forewings: 1b furcate, 5 absent, 6 and 7 stalked, 7 to costa, 8 absent. Hindwings $\frac{3}{4}$, lanceolate, cilia 3; 5 absent, 6 and 7 stalked.

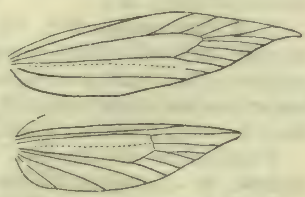
There is but one species. Imago with forewings elongate-lanceolate.

1. **P. obscuripunctella**, *Stt.* 8-10 mm. Forewings light shining grey, somewhat darker-sprinkled; plical stigma dark fuscous, elongate, followed by some whitish scales, second discal fuscous, indistinct. Hindwings grey.

England, common; Holland, Germany; 5. Larva greenish-grey; dorsal line darker; head dark brown; plate of 2 blackish: in blotches in leaves of *Lonicera;* 7. The imago flies along hedges on sunny afternoons.

20. Scythris, *Hb.*

Antennae $\frac{4}{5}$, in ♂ shortly ciliated. Labial palpi long, curved, ascending, second joint smooth-scaled, terminal shorter, acute. Posterior tibiae rough-haired. Forewings: 1b shortly furcate or simple, 5 seldom absent, 6 and 7 stalked, 7 to costa, 8 absent. Hindwings $\frac{2}{3}$ to almost 1, lanceolate, cilia $1\frac{1}{2}$-3; transverse vein sometimes absent, 4 and 5 sometimes stalked or coincident.



Neuration of *Scythris fuscocuprea.*

A rather large and practically cosmopolitan genus, though seemingly much more numerous in the warmer parts of Europe than in other regions. The unicolorous species require careful discrimination. Imago with forewings elongate-lanceolate, sometimes caudate.

1. Forewings with whitish spots . . . . 2.
„ without whitish spots . . . . 5.
2. Hindwings with 5 absent . . . . 3.
„ „ 5 present . . . . 4.
3. Forewings with whitish tornal spot . . 7. *variella.*
„ without whitish tornal spot . 6. *siccella.*
4. Forewings with two whitish dorsal spots . 9. *cicadella.*
„ „ three whitish dorsal spots 8. *chenopodiella.*
5. Forewings with some whitish scales . . 6.
„ without whitish scales . . 7.
6. Expanse 14 mm. or more; 5 of hindwings present 1. *grandipennis.*
„ 12 mm. or less; 5 of hindwings absent 3. *senescens.*
7. Hindwings ⅔, 5 absent . . . 4. *laminella.*
„ nearly 1, 5 present . . . 8.
8. Expanse 12 mm. or more . . . 2. *fuscoaenea.*
„ 11 mm. or less . . . 5. *fuscocuprea.*

1. **S. grandipennis,** *Hw.* 14-18 mm. Abdomen in ♂ rough-haired towards apex, in ♀ beneath pale whitish-ochreous except towards base. Forewings long-pointed, bronzy; usually a few whitish scales in disc, in ♀ sometimes more numerous and forming a longitudinal suffusion. Hindwings almost 1, cilia less than 2; dark grey; 4 and 5 connate or stalked.

England to Lancashire, E. Ireland, rather local; France, S. Germany; 6. Larva dark grey-green; dorsal line paler; sub-dorsal darker; dots black; head brownish: in a web amongst shoots of *Ulex;* 2-4.

2. **S. fuscoaenea,** *Hw.* 12-14 mm. Abdomen in ♀ beneath broadly suffused with ochreous-whitish. Forewings relatively narrower than in *S. grandipennis,* dark shining greenish-bronzy, towards apex coppery-tinged. Hindwings almost 1, cilia less than 2; dark fuscous; 4 and 5 connate or stalked.

England to Cumberland, S. Ireland, local; C. and SE. Europe; 6. Larva on *Helianthemum;* 5.

3. **S. senescens,** *Stt.* 10-12 mm. Abdomen in ♀ beneath with ochreous-whitish blotch extending over two or more ante-apical segments. Forewings moderately long-pointed, dark bronzy-fuscous, with scattered whitish hair-scales, especially

towards apex. Hindwings nearly 1, cilia less than 2; dark purplish-fuscous; 5 absent.

England, local; C. Europe; 7. Larva dull grey-green, with several whitish lines; dots blackish; head brown-black: in a slight web amongst shoots of *Thymus*; 5.

4. **S. laminella**, *HS.* 9-11 mm. Abdomen in ♀ beneath with pale ochreous-yellowish anteapical blotch. Forewings rather short-pointed, dark purplish-bronzy-fuscous. Hindwings ⅔, cilia over 2; dark fuscous; 5 absent.

Sussex, Dorset, local; C. Europe; 7. Larva dull brown, greenish-tinged; subspiracular line whitish-yellowish; head and plate of 2 dull yellowish, laterally blackish-marked: in a loose web among stems of *Helianthemum*; 5, 6.

5. **S. fuscocuprea**, *Hw.* 9-11 mm. Abdomen in ♀ beneath with an ochreous-whitish suffusion on anteapical segment. Forewings rather short-pointed, shining dark bronzy. Hindwings nearly 1, cilia less than 2; dark purplish-fuscous; 4 and 5 connate or stalked.

England, E. Ireland, local; France, Germany; 6, 7. Larva in a slight web amongst shoots of *Lotus corniculatus*; 5.

6. **S. siccella**, *Z.* 8-9 mm. Abdomen in ♀ beneath becoming grey-whitish posteriorly. Forewings rather short-pointed, dark fuscous, more or less sprinkled with whitish hair-scales; fold blackish, with a white streak or dash, variable in development, before middle, sometimes nearly reaching base, and a white dot slightly beyond middle. Hindwings ⅔, cilia 3; dark fuscous; 5 absent.

Dorset, local; C. Europe; 7. Larva slender, dull purple; incisions paler, between 2-6 whitish; spots sometimes white; head and plate of 2 black-brown: in long silken galleries along stems of *Thymus*, *Lotus*, *Plantago*, *Cerastium*, etc., mining into leaves; 5.

7. **S. variella**, *Stph.* 9-10 mm. Abdomen more or less wholly suffused with whitish. Forewings moderately pointed, grey to dark fuscous, strewn with whitish scales; an indistinct whitish spot on fold before middle, a larger one beyond middle, and another on tornus. Hindwings ⅔, cilia 3; light grey; 5 absent.

Hants, Dorset, local; N. and NC. Europe; 6, 7. Larva slender, dull purple-brown; head black; plate of 2 dark brown: in long silken galleries along stems of *Erica* and *Calluna*; 5.

8. **S. chenopodiella**, *Hb.* 14-15 mm. Abdomen suffused

with fuscous-whitish beneath. Forewings rather long-pointed, dark purplish-grey; three ochreous-whitish spots towards dorsum before and about middle and at tornus, variably connected above or on dorsum, first connected with base by a streak along fold. Hindwings $\frac{3}{4}$, cilia 2; dark fuscous, partly semihyaline towards base; 4 and 5 stalked.

Middlesex, Essex, Gloucester, York, local; Europe, WC. Asia to N. Persia; 6-9. Larva greenish-grey, with several darker lines; head grey, black-speckled; 2 with two large black spots: amongst spun flowers and shoots of *Chenopodium* and *Atriplex;* 4-8.

9. **S. cicadella**, *Z.* 11-12 mm. Abdomen more or less whitish beneath posteriorly. Forewings short-pointed, dark grey, bronzy-tinged, sprinkled with whitish; a whitish line along fold from base to beyond middle; cloudy whitish dorsal spots towards base and before tornus, separated by a quadrate dark spot; an ill-defined whitish spot in disc at $\frac{3}{4}$, and an apical dash. Hindwings $\frac{2}{3}$, cilia over 2; rather dark fuscous; 4 and 5 separate.

Surrey to Suffolk, local; Holland, Germany; 7. Larva fuscous; dorsal line broad, yellow-brown, on 2-4 narrower and white; lateral whitish; head dark brown, black-marked; 2 brown, with two black crescentic marks: in sand-tubes amongst roots and stems of *Scleranthus perennis;* 5, 6.

21. ENDROSIS, *Hb.*

Antennae $\frac{3}{4}$, in ♂ fasciculate-ciliated. Labial palpi long, recurved, second joint smooth, terminal as long, acute. Posterior tibiae rough-haired. Forewings: 1b imperfectly furcate, 7 and 8 stalked, 7 to costa. Hindwings under 1, ovate-lanceolate, with transparent subbasal patch, cilia 2; 3 and 4 connate or short-stalked, 6 absent.

The genus contains only a single species, now domesticated in houses in many parts of the world; its real origin and affinities are alike uncertain. Imago with forewings elongate, pointed.

1. **E. lacteella**, *Schiff.* (*fenestrella*, Stt., non Sc.) 14-20 mm. Head white. Thorax white, anterior edge dark fuscous. Forewings greyish-ochreous, coarsely irrorated with black, with some white scales; a white basal dot; stigmata black, first discal much beyond plical; an indistinct whitish costal spot at $\frac{3}{4}$. Hindwings pale grey, more whitish towards base; cilia ochreous-tinged.

Britain to the Shetlands, Ireland, very common in houses; Europe, Asia Minor, N. America, S. Africa, Australia, New Zealand; 3-10. Larva whitish; head reddish-brown; 2 pale brown posteriorly: on seeds, dry refuse, etc.; 1-12.

22. CATAPLECTICA, *Wlsm.*

Antennae ¾, in ♂ evenly ciliated. Labial palpi moderate or rather short, slightly curved, porrected, filiform, pointed. Posterior tibiae rough-haired. Forewings: 1b furcate, 7 and 8 stalked, 7 to termen. Hindwings under 1, lanceolate or ovate-lanceolate, cilia 1-3; veins all separate.

A small European genus, not yet identified elsewhere. Imago with forewings elongate-lanceolate. Larva feeding on seeds of *Umbelliferae.*

1. Forewings with pale subapical fascia . 2. *Farreni.*
 ,, without subapical fascia . . 2.
2. Forewings with pale yellowish spots . . 3.
 ,, without pale spots . . 1. *profugella.*
3. Forewings with subcostal spot before middle 3. *auromaculata.*
 ,, without subcostal spot before middle 4. *fulviguttella.*

1. C. **profugella,** *Stt.* 8-9 mm. Forewings rather dark fuscous, slightly bronzy-tinged. Hindwings dark fuscous.

Kent, I. of Wight, Lancashire to Durham, local; Germany, Finland; 7, 8. Larva pale grey; spots fuscous: amongst seeds of *Pimpinella, Angelica, Aegopodium,* etc.; 9, 10.

2. C. **Farreni,** *Wlsm.* 9-10 mm. Forewings dark fuscous, with a few whitish-ochreous scales; an ill-defined costal spot before middle, one on dorsum before middle, a third before tornus, and an irregular subapical fascia whitish-ochreous. Hindwings dark grey.

Cambridge, local; not recorded elsewhere; 6, 7. Larva probably on seeds of *Peucedanum sativum;* 8, 9.

3. C. **auromaculata,** *Fr.* 11-13 mm. Forewings rather dark fuscous; an indistinct spot beneath costa before middle, a spot on dorsum beyond it, and a larger spot in disc posteriorly pale ochreous-yellowish. Hindwings rather dark fuscous.

Shetlands, local; Alps of Switzerland; 8, 9. Larva whitish: subdorsal line pale brownish; spots grey; head black: in seed-vessels of *Angelica;* 9, 10.

4. C. **fulviguttella,** *Z.* (*flavimaculella,* Stt.) 10-11 mm. Forewings dark fuscous; a spot on dorsum towards tornus, and

another in disc posteriorly pale ochreous-yellow. Hindwings dark fuscous.

Britain to Aberdeen, E. Ireland, rather common; C. Europe; 7, 8. Larva whitish; head brownish: amongst seeds of *Angelica* and *Heracleum*; 9, 10.

23. PHAULERNIS, *n.g.*

Antennae $\frac{2}{3}$, in ♂ evenly ciliated. Labial palpi short, drooping, filiform, pointed. Posterior tibiae rough-haired. Forewings with small dorsal scale-tooth; 1b furcate, 7 to termen. Hindwings $\frac{2}{3}$, ovate-lanceolate, cilia nearly 2; veins all separate.

Restricted to the single species; a development of *Epermenia*. Imago with forewings broad-lanceolate. This genus is *Aechmia* of Stainton but not of Zeller.

1. **P. dentella**, *Z.* 9-10 mm. Forewings dark fuscous, sometimes obscurely irrorated with whitish; an obscure whitish spot on dorsum at $\frac{1}{4}$. Hindwings dark fuscous.

Surrey to Dorset and Norfolk, local; C. Europe; 6. Larva yellowish, with darker lines; head dark brown: amongst seeds of *Chaerophyllum*, *Pimpinella*, *Aegopodium*, etc.; 7, 8.

24. SCHRECKENSTEINIA, *Hb.*

Antennae $\frac{3}{4}$, in ♂ thick, shortly ciliated. Labial palpi long, recurved, second joint smooth, terminal shorter, tolerably pointed. Posterior tibiae bristly above. Forewings: 1b simple, 7 to termen. Hindwings $\frac{2}{3}$, lanceolate, cilia over 2; veins all separate.

A curious genus, composed of two or three northern temperate species. Imago with forewings narrow-elongate, costa anteriorly straight, posteriorly strongly arched; in repose the posterior legs are sometimes erected obliquely above the body. Larva clothed with stiff transparent bristles. Pupa in an open network cocoon.

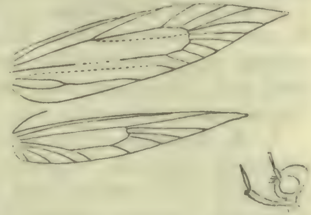
1. **S. festaliella**, *Hb.* 10-12 mm. Head pale metallic bronzy-ochreous. Forewings pale shining ochreous; base and costa suffused with fuscous; a dark fuscous streak from base along fold to tornus, thence along termen nearly to apex; a dark fuscous median longitudinal streak from before $\frac{1}{3}$ of disc to costa close before apex, at $\frac{2}{3}$ enlarged into a spot, which tends to form a fascia with dark costal and tornal suffusion. Hindwings dark grey.

Britain to Sutherland, Ireland, common; C. Europe, N.

America; 5, 6, 8. Larva pale green; dorsal line darker; head and plate of 2 green: beneath leaves of *Rubus*; 7, 9.

25. Epermenia, *Hb.*

Antennae $\frac{4}{5}$, in ♂ evenly ciliated. Labial palpi long, recurved, thickened with loose scales, terminal joint about half second, rather obtuse. Posterior tibiae rough-haired. Forewings with one or more dorsal scale-teeth: 1b furcate, 7 and 8 sometimes stalked, 7 to termen. Hindwings $\frac{2}{3}$, elongate-lanceolate, cilia 2-4; 6 and 7 approximated or stalked.



Neuration and head of *Epermenia chaerophyllella.*

Though not numerous in species, this genus is nearly cosmopolitan. Imago with forewings more or less narrowly elongate, pointed. Pupa in an open network cocoon.

1. Forewings with four dorsal scale-teeth . . 2.
„ „ two dorsal scale-teeth . . 3.
2. Dark line of cilia subfalcate at apex 2. *chaerophyllella.*
„ „ „ not subfalcate . . 3. *daucella.*
3. Forewings pale ochreous . . . 1. *illigerella.*
„ grey . . . . 4. *insecurella.*

1. **E. illigerella**, *Hb.* 12-14 mm. Forewings pale ochreous; costa fuscous on anterior half; an indistinct fuscous streak from base of dorsum to beneath $\frac{1}{3}$ of costa; a rather dark ochreous-fuscous fascia from middle of costa obliquely inwards, dilated on costa, emitting from dilation a streak to tornus; an inwardly oblique dark ochreous-fuscous spot on costa before apex; second discal stigma dark fuscous; two black dorsal scale-teeth; dark line of cilia subfalcate at apex. Hindwings dark grey.

S. England to Worcester and Norfolk, local; C. Europe; 6, 7, 8, 9. Larva yellow-green; dorsal line darker; head yellowish-brown: amongst spun leaflets or umbels of *Angelica* and *Aegopodium*; 5, 6, 8. The threads spun by the larva of this and the following species are covered with minute drops of a sticky secretion.

2. **E. chaerophyllella**, *Gz.* 12-13 mm. Forewings brown, mixed with whitish and more or less sprinkled with black, on costa strigulated with black; a black inwardly oblique fascia from costa before middle, followed by a darker brown suffusion;

beyond this two white dots placed longitudinally in disc, sometimes connected by a black spot; an irregular black spot on costa towards apex; four dorsal scale-teeth, first two ochreous-brown, others black; dark line of cilia subfalcate at apex. Hindwings grey.

Britain to Caledonian Canal, N. and E. Ireland, common; N. and C. Europe, Asia Minor; 7, 8, 10-4. Larva yellow-whitish or green-whitish; dorsal line whiter; spots brownish; head pale brown: in slight web beneath leaves of *Heracleum*, *Peucedanum*, *Anthriscus*, etc.; 6, 9.

3. **E. daucella**, *Pey.* 9-12 mm. Forewings narrow, light brownish-ochreous, brighter posteriorly; costa and dorsum sprinkled with rather dark fuscous, tending to form spots; a slender fuscous inwardly oblique fascia from costa before middle; a cloudy rather dark fuscous spot on tornus; four black dorsal scale-teeth; dark lines of cilia forming a blackish spot at apex. Hindwings grey.

Sussex to Dorset, local; France; 6, 7, 9, 10. Larva yellow-green; dorsal line somewhat darker; spots black; head and bisected plate of 2 black: mining blotches in leaflets, finally feeding externally on *Daucus carota;* 5, 6, 8, 9.

4. **E. insecurella,** *Stt.* 9-11 mm. Forewings grey, more or less mixed with pale ochreous-yellowish, suffused with whitish-ochreous towards base; a darker grey rather inwardly oblique fascia from costa before middle, followed by a pale dorsal spot; two or three blackish dots in disc anteriorly, and two placed longitudinally in disc posteriorly; two black dorsal scale-teeth. Hindwings grey.

Sussex and Surrey to Dorset and Wilts, on chalk downs, local; Germany; 5, 6, 7, 8. Larva yellowish; dorsal and subdorsal lines brownish; head black: mining leaves, afterwards feeding externally, on *Thesium linophyllum;* 4, 5, 7

5. PLUTELLIDAE.

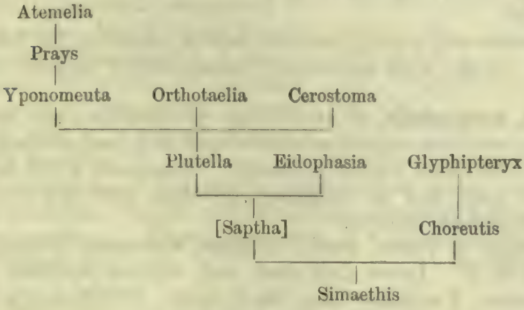
Head with appressed or sometimes loose scales. Tongue developed. Antennae $\frac{1}{2}$-$\frac{3}{4}$. Labial palpi usually long, curved, ascending, terminal joint pointed. Maxillary palpi sometimes developed, filiform, porrected. Posterior tibiae smooth-scaled. Forewings: 1b furcate, 7 and 8 usually separate, 7 to termen. Hindwings 1 or somewhat over 1, ovate to ovate-lanceolate; 3 and 4 often remote, 6 and 7 usually parallel.

This family is now of only moderate extent, and contains no dominant genera; it would seem to have been in great measure supplanted by its derivatives. Its characters, as usual in very early groups except when isolated, are somewhat undefined and fluctuating. Although nowhere very prominent, it is relatively more numerous in Australia, New Zealand, and oceanic islands than elsewhere.

Larva more or less elongate, with 10 prolegs; usually feeding in a slight web on leaves or seeds, seldom mining. Pupa with segments 9-11 free, sometimes also 8 and in ♂ 12: usually not protruded from cocoon in emergence.

An exotic genus is introduced (in brackets) into the diagram, to explain the phylogeny; but the British genera in any case give only an inadequate notion of the family.

Phylogeny of Plutellidae.



Tabulation of Genera.

1. Hindwings with 4 absent . . . 2.
,, ,, all veins present . . . 4.
2. Forewings with 7 and 8 stalked . . . 3.
,, ,, 7 and 8 separate 3. Yponomeuta.
3. Labial palpi moderately long, subascending 2. Prays.
,, short, drooping . . . 1. Atemelia.
4. Antennae thickened with scales towards base 7. Eidophasia.
,, not thickened with scales . . 5.
5. Hindwings with 6 and 7 stalked . . 5. Cerostoma.
,, ,, separate . . 6.
6. Antennae in ♂ ciliated with long fascicles . 7.
,, shortly ciliated . . . 8.

7. Labial palpi with second joint tufted, terminal acute 9. Choreutis.
,, ,, second joint not tufted, terminal not acute . . 10. Simaethis.
8. Labial palpi with second joint more or less tufted 6. Plutella.
,, ,, second joint not tufted . 9.
9. Hindwings with 3 and 4 remote . 4. Orthotaelia.
,, 3 and 4 connate or stalked 8. Glyphipteryx.

1. Atemelia, *HS.*

Head above loosely haired. Antennae $\frac{2}{3}$, in ♂ simple, basal joint rather short, with pecten. Labial palpi short, drooping, filiform. Maxillary palpi rudimentary. Forewings: 7 and 8 stalked. Hindwings 1, elongate-ovate, cilia 1; 4 absent, 6 and 7 parallel.

Includes only a single species, nearly related to the following genus. Imago with forewings elongate, rather narrow, termen oblique.

1. **A. torquatella**, *Z.* 10-11 mm. Forewings dark fuscous; a cloudy ochreous-whitish subdorsal spot at $\frac{1}{3}$, and another about tornus, sometimes partially obsolete; sometimes a dot on costa towards apex, and an indistinct terminal spot below middle. Hindwings dark fuscous.

Durham to Perth, local; Holland, Germany, Russia, Asia Minor; 6, 7. Larva dull dark red, whitish-marbled; head pale brown; 2 with two large black spots: in blotches in leaves of birch and elm; 8-10.

2. Prays, *Hb.*

Head with appressed scales. Antennae $\frac{3}{4}$, in ♂ serrulate, pubescent, basal joint without pecten. Labial palpi moderate, curved, subascending, second joint somewhat rough beneath, terminal longer than second. Maxillary palpi obsolete. Forewings: 7 and 8 stalked. Hindwings 1, elongate-ovate, thinly scaled near base, cilia $\frac{2}{3}$; 4 absent, 6 and 7 parallel.

A very small genus, found in Europe, Asia, and Australia. Imago with forewings elongate, rather narrow, termen oblique.

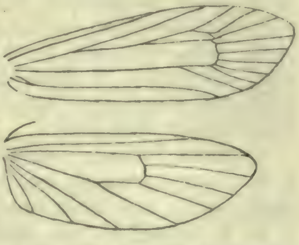
1. **P. curtisellus**, *Don.* 15-17 mm. Head white or greyish-ochreous. Forewings white or greyish-ochreous; some blackish dorsal strigulae; a triangular blackish blotch, lighter or mixed with whitish on costa, extending along costa from near base to

⅔; some irregular blackish marks towards termen; sometimes the whole wing is unicolorous dark fuscous. Hindwings rather dark grey.

Britain to Caledonian Canal, Ireland, common; C. Europe, Asia Minor; 6, 7. Larva greenish, marbled with red-brown above; dorsal line deep green; head pale brown, dark-spotted; 2 with two black spots: when young mining in leaves, afterwards in bark of shoots, ultimately in spun shoots of ash; 10-5.

3. Yponomeuta, *Latr.*

Head smooth. Antennae ¾, in ♂ filiform, minutely ciliated, basal joint without pecten. Labial palpi moderate, curved, ascending, second joint with appressed scales, terminal as long as or longer than second, somewhat roughened in front, acute. Maxillary palpi rudimentary. Forewings: 7 and 8 separate. Hindwings 1, elongate-ovate, with transparent subbasal patch, cilia ⅔; 4 absent, 6 and 7 nearly parallel.



Neuration of *Yponomeuta plumbellus*.

A rather small but nearly cosmopolitan genus, absent from New Zealand. Imago with forewings elongate, rather narrow, termen oblique. Larva gregarious, in a dense common web.

1. Head grey	6. *vigintipunctatus*.
„ white	2.
2. Forewings with blackish spot on fold	3.
„ without such spot	4.
3. Forewings with blackish suffusion in apical cilia	5. *plumbellus*.
„ without blackish apical suffusion	4. *irrorellus*.
4. Lowest series including 9-11 dots	1. *evonymellus*.
„ „ 4-7 dots	5.
5. Cilia of forewings white	2. *cognatellus*.
„ „ more or less grey	3. *padellus*.

1. **Y. evonymellus**, *L.* (*padi*, Z.) 20-23 mm. Head white. Forewings whitish; five or six longitudinal series of numerous black dots, first not reaching middle, lowest including 9-11 dots; some additional black dots before termen; cilia white. Hindwings dark grey.

England, N. Ireland, local; C. Europe, Asia Minor, N. Asia; 7, 8. Larva greenish-grey; lateral series of black spots; dots black; head black: on *Prunus padus;* 6.

2. **Y. cognatellus**, *Hb.* (*evonymella*, Sc.) 20-25 mm. Head white. Forewings white; four longitudinal series of few black dots, first not reaching middle, second beginning near before middle, lowest including 4-7 dots; some additional black dots before termen; cilia white. Hindwings dark grey.

England, Ireland, common; Europe; 7, 8. Larva pale greyish-yellowish; spots black; head black: on *Euonymus;* 5, 6.

3. **Y. padellus**, *L.* 16-20 mm. Head white. Forewings light grey, sometimes more or less suffused with white, especially towards dorsum; four longitudinal series of few black dots, first not reaching middle, second beginning beyond extremity of first, lowest including 4-6 dots; some additional black dots before termen; cilia light grey. Hindwings rather dark grey.

England, Ireland, common; Europe, WC. Asia to Turkestan; 7, 8. Larva greenish-grey; spots black; head black: on hawthorn, apple, and blackthorn; 5, 6.

4. **Y. irrorellus**, *Hb.* 22-25 mm. Head white. Forewings whitish-grey or whitish, termen greyer; four longitudinal series of few black dots, first not reaching middle, second beginning near before middle, lowest including 6-7 dots; a dark grey elongate spot on fold before middle; a rather dark grey elongate suffusion in disc beyond middle; a subterminal series of black dots; cilia grey. Hindwings dark grey.

Surrey, local; C. Europe, Asia Minor; 7. Larva on *Euonymus;* 5, 6.

5. **Y. plumbellus**, *Schiff.* 17-19 mm. Head white. Forewings grey-whitish; five longitudinal series of few black dots, first not reaching middle, lowest including 6-8 dots; a blackish spot on fold before middle; some additional black dots towards termen; an apical spot connected with a suffusion in apical cilia blackish-grey. Hindwings rather dark grey.

England to Westmoreland, common; C. Europe; 7, 8. Larva yellowish-grey; spots black: on *Euonymus;* 5, 6.

6. **Y. vigintipunctatus**, *Retz.* 15-17 mm. Head grey. Forewings grey; three longitudinal series of few black dots; a small blackish spot at base of apical cilia. Hindwings rather dark grey.

Kent to Dorset and Norfolk, local; C. Europe; 4, 5, 8.

Larva yellowish-grey; spots black: on *Sedum telephium;* 6, 7, 9, 10.

4. ORTHOTAELIA, *Stph.*

Head with appressed hairs. Antennae $\frac{3}{5}$, in ♂ serrate, shortly ciliated, basal joint without pecten. Labial palpi long, recurved, second joint with appressed scales, terminal longer than second, acute. Maxillary palpi very short, filiform. Abdomen elongate. Forewings: 7 and 8 separate, 8 to apex. Hindwings over 1, oblong-ovate, cilia $\frac{1}{4}$; 3 and 4 connate, 6 and 7 nearly parallel.

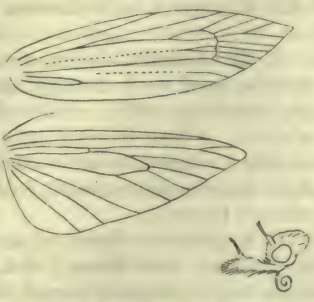
Includes only the single species. Imago with forewings elongate, rather narrow, termen straight, little oblique.

1. **O. sparganella**, *Thnb.* 21-28 mm. Forewings whitish-ochreous to reddish-ochreous, usually more or less suffused with dark purplish-fuscous, especially on a longitudinal discal streak dilated posteriorly, veins often marked with pale streaks; often several dark fuscous dots on fold, and a suffused dark spot in disc at $\frac{2}{3}$. Hindwings ochreous-whitish to whitish-grey, lower half of termen suffused with grey.

England to York, rather local; N. and C. Europe; 7, 8. Larva grey or whitish; head reddish-brown; 13 much flattened: in stems and leaves of *Sparganium*, *Iris*, *Poa aquatica*, etc.; 5, 6.

5. CEROSTOMA, *Latr.*

Head with appressed or loose hairs. Antennae $\frac{3}{4}$, sometimes rough-scaled above towards base, in ♂ simple, basal joint usually with flap of dense scales. Labial palpi long, recurved, second joint with projecting tuft of scales beneath, terminal longer or shorter than second, sometimes roughened in front, acute. Maxillary palpi moderate or short, filiform, porrected. Forewings: 2 and 3 sometimes stalked, 7 and 8 sometimes stalked. Hindwings over 1, elongate-ovate, cilia $\frac{3}{4}$-1; 3 and 4 sometimes approximated, 6 and 7 stalked.



Neuration and head of *Cerostoma radiatella.*

A northern temperate genus of some extent. Imago with forewings elongate, more or less narrow, apex often produced or falcate, termen very oblique: antennae porrected in repose.

Larva attenuated towards extremities; feeding in a slight web on leaves of trees and shrubs. The structure of veins 7 and 8 of the forewings varies within the limits of the same species.

1.	Forewings with apex strongly falcate	2.
	,, ,, not falcate	3.
2.	Forewings deep ochreous-brown	2. *xylostella.*
	,, whitish-ochreous	3. *nemorella.*
3.	Forewings with apex very strongly produced	1. *caudella.*
	,, ,, not strongly produced	4.
4.	Forewings with scale-tufts on surface	5.
	,, without scale-tufts	7.
5.	Forewings wholly dark ferruginous-fuscous	6. *horridella.*
	,, at least partly whitish	6.
6.	Forewings with dorsal half mostly dark fuscous	5. *scabrella.*
	,, ,, ,, not dark fuscous	4. *asperella.*
7.	Head whitish	8.
	,, not whitish	10.
8.	Forewings ochreous-white	12. *sequella.*
	,, pale or deep ochreous	9.
9.	Forewings with blackish dot above tornus	10. *costella.*
	,, without such dot	7. *lucella.*
10.	Forewings with two transverse streaks	11.
	,, without transverse streaks	12.
11.	Streaks not reaching above middle	8. *alpella.*
	,, nearly reaching costa	9. *sylvella.*
12.	Forewings with dorsum blackish	13. *vittella.*
	,, ,, ,, not blackish	11. *radiatella.*

1. **C. caudella**, *L.* (? *mucronella*, Sc.) 26-32 mm. Forewings narrow, apex very strongly and acutely produced; light brownish-ochreous, with scattered black scales, veins obscurely whitish; a dark fuscous streak along fold from base to beyond middle; sometimes other dark streaks between veins; a raised dark fuscous dot beneath fold before middle. Hindwings pale whitish-fuscous.

S. England to Hereford and Norfolk, not uncommon; C. and S. Europe, Asia Minor; 8-4. Larva greenish-grey, marbled with rosy-ochreous; dorsal line whitish; 3 and 4 with pairs of black spots: on *Euonymus;* 6-8.

2. **C. xylostella**, *L.* (*harpella*, Schiff.) 17-21 mm. Head and thorax white, patagia deep brown. Forewings with apex very strongly falcate; deep ochreous-brown, lighter towards costa anteriorly; a light yellow dorsal streak from base to tornus,

edged above by a fine white line which is posteriorly bent obliquely upwards to disc at $\frac{2}{3}$. Hindwings rather dark grey.

Britain to Roxburgh, N. Ireland, common; C. and SE. Europe, Asia Minor; 7, 8. Larva pale yellowish-green; dorsal stripe broad, brown-reddish: on *Lonicera;* 5, 6.

3. **C. nemorella**, *L.* 21-23 mm. Head and thorax ochreous-whitish, patagia light ochreous. Forewings with apex falcate; whitish-ochreous, more or less brownish-tinged between veins, with scattered black scales; a darker brownish streak along fold; a black dot below fold before middle. Hindwings pale grey, darker terminally.

England, N. Ireland, rather local; C. Europe; 7, 8. Larva rosy-ochreous; dorsal line whitish; 7 and 9 with oblique black lateral marks: on *Lonicera;* 5, 6.

4. **C. asperella**, *L.* 20-21 mm. Head and thorax white. Forewings with apex subfalcate; ochreous-grey-whitish, with a few black scales; a triangular greyish dorsal blotch before middle, dorsal extremities marked with blackish spots, with several raised tufts; a bent greyish sometimes interrupted streak from middle of costa to tornus; a greyish costal mark at $\frac{3}{4}$; a black dot on middle of termen. Hindwings light grey, darker posteriorly.

Dorset, Hereford, local and scarce; C. Europe, Asia Minor, N. Asia; 8-4. Larva on apple; 6.

5. **C. scabrella**, *L.* 19-22 mm. Head and thorax whitish, streaked with dark fuscous. Forewings with apex acutely produced; whitish, more or less sprinkled with light purplish-fuscous and black, veins ferruginous-brown; dorsal half more or less wholly suffused with dark purplish-fuscous, with one or two black streaks, a dorsal streak darker; three blackish scale-tufts below fold and one above tornus. Hindwings light grey, darker posteriorly.

England, local; C. Europe; 7, 8. Larva green; dorsal line broad, white; dots black; head green: on apple and hawthorn; 5, 6.

6. **C. horridella**, *Tr.* 18-20 mm. Head and thorax dark fuscous. Forewings with apex acutely produced; dark fuscous, tinged with ferruginous or purplish; a darker dorsal streak, on upper edge of which are three black scale-tufts. Hindwings rather dark fuscous.

Hants, Dorset, Wilts, local and uncommon; C. Europe; 7, 8. Larva green; dorsal and lateral lines narrow, yellowish-white; head grey-green: on blackthorn and apple; 5, 6.

7. **C. lucella**, *F.* 16-18 mm. Head and thorax whitish, patagia ochreous. Forewings with termen subsinuate; pale ochreous, finely and indistinctly reticulated with darker; dorsum sometimes indistinctly whitish to middle, indistinct darker suffusions towards dorsum before and beyond middle. Hindwings light grey.

England to Durham, local; C. and S. Europe; 7, 8. Larva green; subdorsal line yellowish; dots black: on oak; 5, 6.

8. **C. alpella**, *Schiff.* 13-16 mm. Head and thorax whitish-ochreous. Forewings whitish-ochreous, indistinctly reticulated with deeper ochreous or light fuscous; two oblique fuscous streaks from dorsum before and beyond middle, not reaching more than half across wing. Hindwings pale grey, darker posteriorly.

England to York, local; C. Europe; 8. Larva on oak; 6.

9. **C. sylvella**, *L.* 17-19 mm. Head and thorax pale ochreous. Forewings pale golden-ochreous, with some light fuscous strigulae; two slender parallel oblique ochreous-fuscous or dark fuscous fasciae, usually somewhat interrupted near costa. Hindwings light grey, darker posteriorly.

England, rather common; C. Europe; 8, 9. Larva yellowish-green; dorsal line narrow, yellow; dots darker: on oak; 6.

10. **C. costella**, *F.* (*?parenthesella*, L.) 16-18 mm. Head white or ochreous-whitish. Forewings pale or rather deep golden-ochreous, with scattered blackish strigulae, sometimes much suffused with dark bronzy-fuscous; usually a white longitudinal blotch extending along or beneath basal half of costa; a blackish dot above tornus, and another at apex. Hindwings grey.

Britain to Caledonian Canal, Ireland, common; N. and C. Europe; 8, 9. Larva yellowish-green; subdorsal line slender, yellowish; dots black; head brownish: on oak, birch, hornbeam, etc.; 5, 6.

11. **C. radiatella**, *Don.* 17-19 mm. Head ferruginous-ochreous or grey. Forewings narrower than in *C. costella*, pale grey or pale greyish-ochreous to deep ferruginous-ochreous or dark bronzy; sometimes several small darker spots, or indistinct longitudinal streaks of whitish irroration, or a dark fuscous median longitudinal streak from base to apex; a dark fuscous dot above tornus; a costal patch of thickened membrane between 11 and 12. Hindwings grey.

Britain to Caledonian Canal, Ireland, very common; 8-4. Larva green; spots darker: on oak; 5, 6.

12. **C. sequella**, *Cl.* 17-19 mm. Head and thorax white. Forewings ochreous-white, with a few black strigulae, especially on basal half of costa; a spot beneath costa near base, two inwardly oblique irregular sometimes interrupted marks from costa about middle and $\frac{3}{4}$, and three rather elongate nearly confluent dorsal spots black. Hindwings grey.

England, rather local; C. Europe, Asia Minor; 8, 9. Larva on *Salix;* 5, 6.

13. **C. vittella**, *L.* 17-19 mm. Head light grey. Forewings pale grey or whitish-grey, sometimes brownish-mixed, sprinkled or strigulated with dark grey, sometimes more or less wholly suffused with blackish; a blackish or dark fuscous streak along dorsum, forming triangular projections upwards before and beyond middle. Hindwings grey.

Britain to the Clyde, common; C. Europe, Asia Minor; 7, 8. Larva brown-blackish; dorsal stripe broadly whitish: on elm and beech; 5, 6.

6. PLUTELLA, *Schrk.*

Head with appressed or loose scales. Antennae $\frac{3}{4}$, somewhat thick basally, in ♂ simple, basal joint with dense anterior flap of scales. Labial palpi long, recurved, second joint beneath with more or less developed dense projecting tuft, terminal as long as second, acute. Maxillary palpi moderate or short, filiform, porrected. Forewings: 7 and 8 separate. Hindwings 1, elongate-ovate or ovate-lanceolate, cilia $\frac{4}{5}$ - $1\frac{1}{4}$; 3 and 4 somewhat approximated or connate, 5 and 6 sometimes stalked, 7 parallel.

A small cosmopolitan genus, of which the species are sometimes artificially spread. Imago with forewings elongate, narrow, termen very oblique; antennae porrected in repose. Larva attenuated towards extremities; feeding in a slight web on leaves of *Cruciferae.* Pupa in an open network cocoon.

1. Tuft of palpi long . . . . 2.
   ,, ,, very short . . . . 3.
2. Forewings fuscous . . 2. *cruciferarum.*
   ,, ochreous suffused with whitish 1. *porrectella.*
3. Dorsum with an ochreous-whitish streak 3. *annulatella.*
   ,, with three whitish spots . 4. *dalella.*

1. **P. porrectella**, *L.* 15-16 mm. Head ochreous-whitish, with central fuscous line. Tuft of palpi long. Forewings pale ochreous, suffusedly streaked with whitish; costa and dorsum blackish-dotted; a whitish subdorsal longitudinal line, thrice

sinuate upwards, margined above with an ochreous-brownish suffusion and some blackish scales, darkest in the depressions; discal stigmata usually indicated by dark fuscous dashes; termen ochreous-brown, spotted with black. Hindwings light grey.

England, N. and E. Ireland, common; C. Europe, Asia Minor, N. America; 5, 7, 8. Larva light green; dorsal line darker; dots black; head brownish-marked: on *Hesperis matronalis;* 4, 6.

2. **P. cruciferarum**, *Z.* (*xylostella*, Hb., non L.) 11-16 mm. Head ochreous-whitish. Tuft of palpi long. Forewings narrow, fuscous, more or less ochreous-tinged, often with darker strigulae, towards costa paler and sometimes partly whitish-sprinkled; a paler or whitish-ochreous dorsal streak from base to tornus, upper edge whitish and thrice sinuate upwards, edged with darker suffusion. Hindwings grey.

Britain to the Shetlands, Ireland, common, often abundant; Europe, Asia, Africa, America, Australia, New Zealand; 5, 8, 9. Larva green: on *Brassica* and other *Cruciferae;* 6, 7, 9, 10. The wide range of this species is no doubt in part artificial, but it soon establishes itself, and seems to flourish equally in all climates.

3. **P. annulatella**, *Curt.* 16-18 mm. Head whitish, with some dark fuscous hairs. Tuft of palpi very short. Forewings light fuscous, much suffused with whitish-ochreous, with scattered dark fuscous strigulae; an ochreous-whitish dorsal streak from base to tornus, upper edge with triangular projections before and beyond middle, towards base blackish-edged. Hindwings light grey.

Devon, Dorset, Denbigh and York to the Orkneys, N. and E. Ireland, local; N. Europe, N. Germany; 7-4. Larva green; spots black, conspicuous; head and 2 black-speckled: amongst spun flowers, leaves, etc., of *Cochlearia officinalis;* 5, 6.

4. **P. dalella**, *Stt.* 19-21 mm. Head fuscous mixed with whitish. Tuft of palpi very short. Forewings fuscous, somewhat whitish-marbled, more strongly posteriorly, with scattered blackish strigulae, especially on costa; a small whitish spot on dorsum towards base, a large triangular one about middle, and another before tornus, blackish-dotted on dorsal edge, dorsum between these dark fuscous. Hindwings grey.

Caernarvon and York to the Shetlands, common; N. and mountains of C. Europe; 8-4. Larva on *Arabis;* 6, 7.

7. Eidophasia, *Stph.*

Head with appressed scales. Antennae ¾, thickened above with scales towards base, in ♂ serrate, shortly ciliated, basal joint with dense anterior flap of scales. Labial palpi long, curved, ascending, second joint with apical projection of scales beneath, terminal as long as second, acute. Forewings: 7 and 8 separate. Hindwings 1, elongate-ovate, cilia ¾; 3 and 4 approximated or connate or stalked, 6 and 7 parallel.

Only two or three northern temperate species are yet known. Imago with forewings elongate, apex rounded, termen oblique; antennae porrected in repose. Larva attenuated towards extremities. Pupa in an open network cocoon.

1. **E. messingiella**, *F.R.* 13-14 mm. Head ferruginous on crown. Forewings dark fuscous; a rather narrow straight yellow-whitish fascia before middle, narrowed towards costa; a whitish costal dot beyond middle. Hindwings grey.

England to Westmoreland, local; Germany, Greece, Asia Minor; 6, 7. Larva green: between spun leaves of *Cardamine amara;* 4, 5.

8. Glyphipteryx, *Hb.*

Head smooth. Antennae ¾, in ♂ filiform, ciliated, basal joint without pecten. Labial palpi moderate, curved, ascending, second joint rough-scaled beneath, terminal shorter than second, somewhat roughened in front, acute. Maxillary palpi rudimentary. Forewings: 7 and 8 sometimes stalked. Hindwings 1, elongate-ovate or narrow-oblong, cilia 1; 3 and 4 connate or stalked, 6 and 7 somewhat approximated or parallel.

A considerable genus, universally distributed, but relatively more numerous in Australia and New Zealand than elsewhere. The species fly in sunshine and frequent flowers, often raising and depressing the wings when at rest, as though fanning themselves. Imago with forewings elongate, termen oblique. Larva rather stout, sluggish, feeding on seeds or in shoots.

1. Forewings with dark line of cilia indented . 2.
„ „ „ not indented 1. *fuscoviridella.*
2. Forewings with blackish tornal mark . 2. *thrasonella.*
„ without blackish tornal mark . . 3.
3. Black apical spot enclosing a silvery dot . 4. *oculatella.*
„ „ without silvery dot . . 4.

4. Hindwings suboblong . . . 3. *haworthana.*
„ not suboblong . . . 5.
5. First costal streak markedly broadest . 5. *equitella.*
„ „ not broader than others 6. *fischeriella.*

1. **G. fuscoviridella,** *Hw.* 12-13 mm. Forewings shining bronzy; costal edge obscurely whitish from before middle to near apex; dark line of cilia not indented. Hindwings rather dark grey.

England, in dry grassy places, very common; France, Spain, Italy; 5, 6.

2. **G. thrasonella,** *Sc.* (*cladiella,* Stt.) 12-15 mm. Forewings shining bronzy, sometimes coppery-tinged; six obscure golden-metallic transverse streaks from costa between $\frac{1}{3}$ and apex, and one or two from dorsum posteriorly, all sometimes obsolete; a violet-black mark on tornus, enclosing two or three golden-metallic dots, and a similar dot above it; sometimes two or three fine black dashes above this; a blackish apical spot; dark line of cilia indented below apex. Hindwings dark fuscous.

Britain to the Shetlands, Ireland, amongst *Juncus* in swampy places, very common; C. Europe; 6, 7. There can be little doubt that the larva feeds on *Juncus.*

3. **G. haworthana,** *Stph.* 11-13 mm. Forewings rather broad, dark golden-bronzy; five shining white strigulae on posterior half of costa, three anterior terminating in leaden-metallic marks; a thick oblique curved pointed white streak from middle of dorsum, reaching more than half across wing; a leaden-metallic tornal mark, white on margin; three leaden-metallic dots on termen; an undefined dark apical spot; dark line of cilia indented below apex; a dark hook above apex. Hindwings suboblong, grey; cilia in ♂ whitish.

England, E. Ireland, local; N. and C. Europe; 5. Larva pale ochreous; head dark brown; plate of 2 brownish-ochreous: in seed-heads of *Eriophorum;* 7-4.

4. **G. oculatella,** *Z.* (?*forsterella,* F.) 9-10 mm. Forewings rather broad, dark bronzy-fuscous; five white streaks from posterior half of costa, second becoming silvery-metallic and reaching beyond middle; a broader slightly curved oblique white mark from middle of dorsum, reaching half across wing; a short white mark before tornus; two or three silvery-metallic dots about tornus; a black apical spot enclosing a silvery-metallic dot; dark line of cilia indented below apex; a dark hook above apex. Hindwings grey.

S. England to Worcester and Cambridge, local; C. and CS.

Europe, Asia Minor; 5, 6. Larva on seeds of *Carex vulpina* and other species; 8-4.

4. **G. equitella**, *Sc.* 9-10 mm. Forewings dark bronzy-fuscous; from five to seven white streaks from posterior half of costa, first markedly broadest and most oblique, others sometimes bright leaden-metallic in disc; a curved very oblique white streak from middle of dorsum, reaching half across wing; an erect silvery-metallic mark before tornus; a silvery-metallic mark along tornal margin; a blackish apical spot; dark line of cilia indented below apex; a dark hook above apex. Hindwings grey.

England, N. Ireland, common; C. and S. Europe, Asia Minor; 6, 7. Larva pale yellow; head and plate of 2 black: in shoots of *Sedum acre;* 5.

6. **G. fischeriella**, *Z.* (*schoenicolella*, Stt.) 7-9 mm. Forewings narrower than in *G. equitella*, dark bronzy-fuscous; five equally narrow white streaks from posterior half of costa; a slightly curved slender very oblique white streak from middle of dorsum, sometimes partially or wholly obsolete; an erect silvery-metallic mark before tornus, meeting second costal streak; a silvery-metallic mark along tornal margin; a blackish apical spot; dark line of cilia indented below apex; a dark hook above apex. Hindwings dark grey.

Britain to the Orkneys, E. Ireland, common; C. and S. Europe, Asia Minor, N. Africa; 5, 6. Larva whitish-green; dorsal vessel dark grey; head and plate of 2 blackish: on seeds of *Dactylis glomerata* and probably *Schoenus;* 7.

9. CHOREUTIS, *Hb.*

Head smooth. Antennae $\frac{3}{4}$, in ♂ ciliated with long fascicles, basal joint sometimes with horny apical projection, without pecten. Labial palpi moderately long, subascending, second joint with rough projecting tuft beneath, terminal as long as or shorter than second, acute. Maxillary palpi obsolete. Forewings: 7 and 8 separate. Hindwings 1, ovate, cilia $\frac{1}{2}$; 3 and 4 connate or stalked, 6 and 7 parallel.

A very small northern temperate genus, of which one species ranges also throughout most of the world. Imago with forewings elongate-triangular, apex obtuse, termen oblique.

1. **C. myllerana**, *F.* (*scintilulana*, Hb.) 10-12 mm. Forewings blackish-brown, whitish-sprinkled in middle, especially towards dorsum; about eight scattered dots or marks, an erect streak from tornus, and a streak almost on termen violet-silvery-

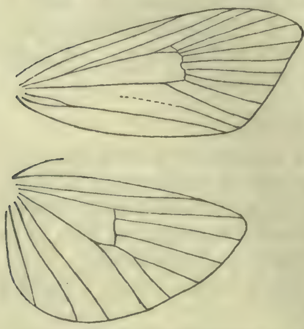
metallic; three white dots on costa, and two or three others in disc. Hindwings dark fuscous; a white median subterminal mark.

Britain to the Clyde, N. Ireland, local; N. and C. Europe, WC. Asia to N. Persia; 7. Larva whitish-green; spots black: in a slight web on *Scutellaria galericulata*; 6.

2. **C. bjerkandrella**, *Thnb.* (*vibrana*, Hb.) 9-11 mm. Forewings brown, somewhat whitish-sprinkled; two short suffused yellow-ferruginous streaks from base; curved cloudy whitish fasciae before middle and at $\frac{3}{4}$; about ten scattered irregular violet-silvery-metallic spots or marks, one in disc beyond middle and one on termen above tornus larger and surrounded with blackish. Hindwings fuscous, darker posteriorly; a white median subterminal mark.

Kent to Dorset and Cambridge, local; C. Europe, WC. Asia to Turkestan, Africa, America, Australia, New Zealand; 8, 9. Larva green, yellower laterally; spots black; head brown: on *Carduus*, *Inula*, *Eryngium*, etc.; 6, 7. The wide range of the species is remarkable, and it is in fact much more plentiful in other regions than in Europe.

10. SIMAETHIS, *Lch.*



Neuration of *Simaethis fabriciana*.

Head smooth. Antennae $\frac{1}{2}$-$\frac{3}{5}$, in ♂ ciliated with long fascicles, basal joint without pecten. Labial palpi moderately long, curved, ascending, second joint rough beneath, terminal shorter than second, thickened with scales, blunt-pointed. Maxillary palpi obsolete. Forewings: 7 and 8 separate. Hindwings 1 or over 1, ovate, cilia $\frac{1}{3}$; 3 and 4 connate or stalked, 6 and 7 parallel.

A genus of moderate extent and universal distribution, but more numerous within the tropics, where the larvae are especially attached to species of *Ficus*. Imago with forewings elongate-triangular, termen little oblique.

Forewings with cilia broadly whitish . 2. *fabriciana.*
,, ,, not whitish . . 1. *pariana.*

1. **S. pariana**, *Cl.* 11-13 mm. Forewings brown, sometimes with a paler-sprinkled postmedian band, sometimes purplish-

tinged; an indistinct dark fuscous dentate line at $\frac{1}{3}$, and another obtusely angulated at $\frac{3}{5}$, both sometimes almost wholly obsolete, or towards costa blackish and edged with whitish costal dots; cilia more purple-tinged. Hindwings dark fuscous.

Britain to the Clyde, local; C. Europe, WC. Asia to Turkestan; 7, 9-3. Larva pale greyish-green; dorsal line broad, yellowish; spots large, black: in a slight web on apple and hawthorn; 5, 6, 8. The imago is sometimes found abundantly in old thatch in autumn.

2. **S. fabriciana**, *L.* 11-13 mm. Forewings dark fuscous, sprinkled with whitish; an indistinct irregular whitish transverse line at $\frac{1}{3}$ and another at $\frac{3}{5}$, preceded by a darker suffusion, both (especially the anterior) sometimes only appearing as whitish costal dots; cilia broadly whitish above and below middle of termen. Hindwings dark fuscous; a whitish subterminal line on dorsal half.

Britain to the Shetlands, Ireland, plentiful; Europe; 5, 6, 8, 9. Larva ochreous-whitish; spots pale fuscous; head and plate of 2 pale fuscous: in a slight web on *Urtica* and *Parietaria;* 4, 5, 7, 8.

6. TINEIDAE.

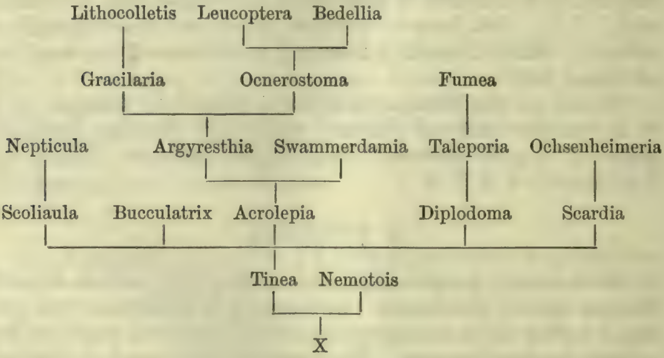
Head usually rough-haired, at least on crown, seldom smooth. Tongue usually developed. Antennae $\frac{1}{2}$-3, sometimes with eyecap. Labial palpi usually porrected or drooping, more or less pointed but hardly acute. Maxillary palpi commonly developed, often several-jointed, folded. Forewings: 1b furcate or simple, 7 and 8 usually separate, one or more veins often absent. Hindwings 1 or under 1, ovate to linear; 3 and 4 usually remote, cell often open, one or more veins often absent.

This family is of large size, and includes forms varying considerably in structure, yet so closely united by transitional gradations that they cannot be satisfactorily separated. Although simple porrected maxillary palpi are found in other families, folded maxillary palpi with five or six joints only occur in this family and the *Micropterygidae;* they are however by no means present in all the genera, and of two closely allied genera are often present in one and obsolete in the other. Their occurrence is in fact so irregular that they seem to offer an exception to the rule that rudimentary organs are not redeveloped; this is probably accounted for by their being persistent in the pupa. Some of the species are extremely small, and in these the neuration is often remarkably degraded. The family is plentifully represented in all regions alike.

Larva more or less elongate, sometimes without prolegs on 10, sometimes with rudimentary processes, seldom apodal, very often mining or case-bearing. Pupa with segments 7-11 and in ♂ 12 free, or some or all of these fixed in the higher genera; usually protruded from cocoon in emergence.

The phylogeny presents considerable difficulties, owing to the degeneration and isolation of some of the genera; only the principal genera are included in the diagram.

Phylogeny of Tineidae.


Lithocolletis
Leucoptera
Bedellia
Gracilaria
Ocnerostoma
Fumea
Nepticula
Argyresthia
Swammerdamia
Taleporia
Ochsenheimeria
Scoliaula
Bucculatrix
Acrolepia
Diplodoma
Scardia
Tinea
Nemotois
X

Tabulation of Genera.

1. Antennae (at least in ♂) 3	2.
,, at most somewhat over 1	4.
2. Maxillary palpi long	42. NEMOPHORA.
,, ,, rudimentary	3.
3. Eyes in ♂ enlarged, approximated above	44. NEMOTOIS.
,, ,, normal	43. ADELA.
4. Face smooth	5.
,, rough	24.
5. Maxillary palpi moderate, porrected	6.
,, drooping or absent	8.
6. Head rough above	8. ORNIX.
,, smooth	7.
7. Labial palpi with second joint tufted	9. CORISCIUM.
,, ,, ,, not tufted	10. GRACILARIA.

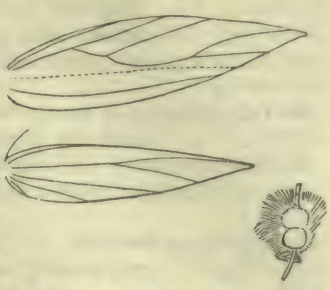
8. Forewings with all veins present . . . 9.
" " one or more veins absent . . 14.
9. Head with appressed scales above . 29. TEICHOBIA.
" more or less rough above . . . 10.
10. Forewings with 7 to costa . . . 11.
" " 7 to termen . . . 12.
11. Hindwings with 3 and 4 connate or stalked
21. ROESLERSTAMMIA.
" " " separate 34. LAMPRONIA.
12. Hindwings with 4 absent . . . 19. ZELLERIA.
" " all veins present . . 13.
13. Hindwings 1, cilia 1 . . . . 22. ACROLEPIA.
" under 1, cilia 2 or more 18. ARGYRESTHIA.
14. Labial palpi rudimentary . . . . 15.
" " distinctly developed . . . 16.
15. Crown densely tufted . . 5. BUCCULATRIX.
" smooth or thinly rough-haired 11. LEUCOPTERA.
16. Antennae over 1, basal joint with eyecap 12. LYONETIA.
" not over 1 . . . . 17.
17. Posterior tibiae with stiff bristles . . 18.
" " smooth or hairy . . . 19.
18. Head wholly smooth . . 13. PHYLLOCNISTIS.
" partly rough . . . 4. OPOSTEGA.
19. Antennae in ♂ with long fine cilia . 15. TISCHERIA.
" " not ciliated . . . 20.
20. Tongue obsolete . . . 16. OCNEROSTOMA.
" present . . . . . 21.
21. Forewings with 1-3 veins absent . . 17. CEDESTIS.
" " 4 or 5 veins absent . . 22.
22. Forewings with 6 and 7 stalked . . 14. BEDELLIA.
" " 6 and 7 separate . . . 23.
23. Maxillary palpi moderate . . . 6. OINOPHILA.
" " rudimentary . 7. LITHOCOLLETIS.
24. Maxillary palpi long, folded . . . 25.
" " very short, simple, or obsolete . 33.
25. Forewings with all veins present . . . 26.
" " two or more veins absent . 29.
26. Forewings with 3 and 4 stalked . . 39. MONOPIS.
" " 3 and 4 separate . . . 27.
27. Forewings with 10, 11, 12 concurrent 40. TRICHOPHAGA.
" " " normal . . 28.
28. Antennae in ♂ unipectinated . 33. INCURVARIA.
" " simple . . 41. TINEA.

29. Basal joint of antennae enlarged to form eyecap . . 30.
„ „ „ not enlarged . . . 32.
30. Forewings with 3 veins absent . . 3. Scoliaula.
„ „ 4 or 5 veins absent . . 31.
31. Cell of forewings open between 6 and 10 2. Trifurcula.
„ „ not open between 6 and 10
1. Nepticula.
32. Antennae 1 . . . 37. Ischnoscia.
„ $\frac{3}{4}$ . . . 38. Phylloporia.
33. Antennae in ♂ bipectinated (♀ apterous) . 34.
„ „ simple . . . . 35.
34. Forewings with flat scales . . 24. Fumea.
„ „ hair-scales . 23. Epichnopteryx.
35. Forewings with all veins present . . . 36.
„ with one or more veins absent . 41.
36. Forewings with 7 to termen . . . 37.
„ „ 7 to costa . . . 39.
37. Forewings with 7 and 8 stalked (♀ apterous)
26. Taleporia.
„ „ 7 and 8 separate . . . 38.
38. Tongue obsolete . . . 28. Diplodoma.
„ developed . . 32. Scythropia.
39. Second joint of labial palpi tufted . 31. Scardia.
„ „ „ not tufted . . 40.
40. Labial palpi with long bristles . . 36. Tineola.
„ „ without long bristles 35. Myrmecozela.
41. Scales of head with flattened tips 30. Ochsenheimeria.
„ „ hairlike . . . . 42.
42. Hindwings with all veins present . . . 43.
„ with vein 4 absent . 20. Swammerdamia.
43. ♀ apterous . . . . 25. Solenobia.
„ winged . . . . 27. Narycia.

1. Nepticula, *Z.*

Head rough. Tongue rudimentary. Antennae $\frac{1}{2}$-$\frac{3}{4}$, in ♂ simple, basal joint much enlarged and concave beneath to form eyecap. Labial palpi short, filiform, drooping. Maxillary palpi long, filiform, folded. Posterior tibiae with bristles above, middle-spurs in or above middle. Forewings: 1b simple, cell usually open between 2 and 6, 3-5 absent, 7 to costa, 8 out of 7 or absent, 9 absent. Hindwings $\frac{1}{2}$-$\frac{2}{3}$, lanceolate, cilia 3-4; cell open between 2 and 6, 3-5 absent, in ♂ sometimes an expansible tuft of hairs from base of costa.

A very large genus, quite cosmopolitan, but probably attaining its greatest development in Europe. Owing to their small size and similarity of appearance the species present considerable difficulty, and have been so much neglected that their distribution is hardly known except in England and Germany, and even there very imperfectly. Most of the species can seldom be obtained except by rearing the larvae, but some fly freely in the sunshine. Imago with forewings lanceolate. Larva without developed legs or prolegs, but with pairs of rudimentary ventral processes on 3, 4, and 6-11, or rarely wholly apodal. Pupa in a firm cocoon, usually outside the mine.


Neuration and head of *Nepticula tityrella.*

1. Forewings with one or more pale spots or fasciae . 2.
,, without pale markings . . 54.
2. Forewings with small pale basal spot . . 3.
,, without such spot . . . 6.
3. Forewings with whitish fascia before middle 58. *sericopeza.*
,, without such fascia . . . 4.
4. Forewings with whitish discal spot before middle 61. *assimilella.*
,, without such spot . . . 5.
5. Forewings with white costal and dorsal spots 62. *subbimaculella.*
,, without such spots . . 4. *basiguttella.*
6. Forewings with pale dorsal spot only . . 7.
,, not with pale dorsal spot only . 9.
7. Dorsal spot hardly beyond middle . 56. *intimella.*
,, ,, on tornus . . . . . 8.
8. Posterior tarsi dark-spotted . 55. *catharticella.*
,, ,, not dark-spotted . 54. *septembrella.*
9. Forewings with silvery-grey basal blotch 65. *headleyella.*
,, without such blotch . . . 10.
10. Forewings with pale costal spot before middle . 11.
,, without pale costal spot before middle 13.
11. Forewings with white discal spot at $\frac{3}{4}$. 59. *quinquella.*
,, without white discal spot . . 12.

12. Dorsal pale spot before tornus . . 63. *argyropeza.*
,, ,, on tornus . . 57. *Weaveri.*
13. Forewings with pale anterior longitudinal patch
60. *trimaculella.*
,, without such patch . . . 14.
14. Forewings with outer half of cilia whitish . 15.
,, ,, ,, not whitish . 26.
15. Pale fascia in or hardly beyond middle . . 16.
,, ,, markedly beyond middle . . 21.
16. Fascia entire or slightly interrupted, shining white 17.
,, reduced to two ill-defined whitish spots
64. *apicella.*
17. Forewings blackish . . . . 18.
,, grey densely irrorated with blackish
43. *agrimoniella.*
18. Outer half of cilia greyish-tinged . . 47. *arcuatella.*
,, ,, not greyish-tinged . . 19.
19. Head pale ochreous . . 45. *angulifasciella.*
,, ferruginous-orange to black . . 20.
20. Head ferruginous-orange . . . 44. *atricollis.*
,, black or ferruginous-brown . . 46. *rubivora.*
21. Fascia metallic . . . . 48. *fulgens.*
,, not metallic . . . . 22.
22. Forewings much suffused with pale yellowish
51. *floslactella.*
,, not much suffused with yellowish . 23.
23. Forewings sprinkled with pale yellowish . 50. *salicis.*
,, not sprinkled with pale yellowish . 24.
24. Head yellowish . . . . . 25.
,, ferruginous-orange to black . 52. *lapponica.*
25. Fascia rather oblique . . . 49. *myrtillella.*
,, hardly oblique . . . 53. *confusella.*
26. Forewings with metallic apical fascia 19. *auromarginella.*
,, without apical fascia . . . 27.
27. Fascia hardly beyond middle . 40. *argentipedella.*
,, markedly beyond middle . . . 28.
28. Forewings with defined purple basal fascia
16. *aeneofasciella.*
,, without such fascia . . . 29.
29. Apical area more or less purple-tinged . . 30.
,, ,, not purple-tinged . . . 52.
30. Fascia more or less shining whitish, not metallic . 31.
,, metallic silvery, golden, or brassy . 38.

31.	Collar dark bronzy-fuscous	32.
	„ pale yellowish or whitish	33.
32.	Forewings anteriorly purple-tinged	34. *plagicolella.*
	„ „ not purple-tinged	35. *ignobilella.*
33.	Head ferruginous-orange	30. *centifoliella.*
	„ lighter yellowish to fuscous	34.
34.	Forewings purplish-fuscous	32. *microtheriella.*
	„ bronzy-fuscous	35.
35.	Fascia yellow-tinged	38. *luteella.*
	„ not yellow-tinged	36.
36.	Forewings somewhat shining	36. *distinguenda.*
	„ not shining	37.
37.	Fascia broad	39. *sorbi.*
	„ narrow	37. *glutinosae.*
38.	Fascia brassy or pale golden	39.
	„ silvery	47.
39.	Head black	40.
	„ orange to dark brown	42.
40.	Forewings with brassy basal patch	18. *splendidissimella.*
	„ without such patch	41.
41.	Fascia anteriorly ill-defined	14. *torminalis.*
	„ „ well-defined	31. *Hodgkinsoni.*
42.	Fascia preceded by distinct purplish fascia	43.
	„ not preceded by a purplish fascia	44.
43.	Expanse 4-5 mm.; head often brown	17. *fragariella.*
	„ 6-7 mm.; head not brown	20. *aurella.*
44.	Fascia at $\frac{3}{4}$	33. *betulicola.*
	„ about $\frac{2}{3}$	45.
45.	Fascia slightly oblique inwards dorsally	22. *poterii.*
	„ not oblique inwards	46.
46.	Head orange	15. *regiella.*
	„ ferruginous to dark fuscous	21. *filipendulae.*
47.	Costa of forewings deep purple	25. *ulmivora.*
	„ „ not purple	48.
48.	Collar pale yellowish	29. *continuella.*
	„ fuscous to black	49.
49.	Apical area deep purple	24. *gratiosella.*
	„ „ dark purplish-fuscous	50.
50.	Fascia preceded by a fuscous suffusion	23. *acetosae.*
	„ „ by a purplish suffusion	51.
51.	Dorsum anteriorly paler; head in ♂ black	27. *marginicolella.*
	„ not paler; head in ♂ orange	28. *alnetella.*

52. Head black . . . 26. *prunetorum.*
„ yellowish . . . . . 53.
53. Forewings shining bronzy-brown . . 41. *tityrella.*
„ dark fuscous . . . 42. *malella.*
54. Forewings pale, coarsely irrorated with dark fuscous . . . . 55.
„ not coarsely irrorated . . 56.
55. Outer part of apical cilia whitish . 66. *pulverosella.*
„ „ „ „ whitish-grey . 67. *cryptella.*
56. Forewings wholly purple-tinged . . . 57.
„ not or partly purple-tinged . . 58.
57. Forewings purplish-grey . . . 1. *pomella.*
„ deep fuscous-purple . 11. *oxyacanthella.*
58. Base of costa purplish . . . 10. *pyri.*
„ „ not purplish . . . 59.
59. Forewings grey . . . . . 60.
„ more or less bronzy . . . 61.
60. Apex faintly purplish-tinged . . 2. *pygmaeella.*
„ not purplish-tinged . 13. *nylandriella.*
61. Apex strongly purple-tinged . . . 62.
„ not or hardly purple-tinged . . 65.
62. Forewings lighter beyond middle . 6. *anomalella.*
„ not lighter beyond middle . . 63.
63. Tips of apical cilia grey-whitish . . . 64.
„ „ „ not whitish . 3. *atricapitella.*
64. Head black . . . . 5. *tiliae.*
„ yellowish . . . . 8. *aucupariae.*
65. Head black . . . 9. *minusculella.*
„ yellowish . . . . . 66.
66. Collar dark bronzy-fuscous . 12. *desperatella.*
„ pale yellowish . . . 7. *viscerella.*

1. **N. pomella**, *Vaughan.* 5-6 mm. Head ochreous-yellow. Antennal eyecaps yellow-whitish. Forewings rather shining purplish-grey. Hindwings light grey.

England to York, local; C. Europe; 5, 8. Larva ochreous-yellow: in small blotches in leaves of apple; 7, 10.

2. **N. pygmaeella**, *Hw.* 4-6 mm. Head ochreous-yellow, collar yellow-whitish. Antennal eyecaps yellow-whitish. Forewings light grey, towards apex faintly purplish-tinged. Hindwings light grey.

England, rather local; Holland, Germany; 5, 8. Larva yellowish: in small blotches in leaves of hawthorn; 7, 9, 10.

3. **N. atricapitella**, *Hw.* (*ruficapitella*, Hw.) 5-7 mm. Head

black, ferruginous-orange, or sometimes mixed, collar often whitish. Antennal eyecaps white. Forewings rather shining bronzy, apex suffused with purple. Hindwings grey.

Britain to the Clyde, common; C. Europe; 5, 8. Larva yellowish: in irregular galleries in leaves of oak; 7, 9, 10.

4. **N. basiguttella**, *Hein.* 5-6 mm. Head black, collar white. Antennal eyecaps white. Thorax anteriorly blackish. Forewings light bronzy-fuscous, becoming dark fuscous towards base, rather dark purplish-fuscous towards apex; an obscure dull whitish basal spot; often an obscure undefined whitish median suffusion. Hindwings light grey.

Suffolk, Cambridge, local; Germany; 5, 8. Larva green: in irregular galleries, quite filled with excrement, in leaves of oak; 7, 9, 10.

5. **N. tiliae**, *Fr.* 5-6 mm. Head black, collar white. Antennal eyecaps white. Forewings shining bronzy, somewhat darker towards base, apical fourth fuscous-purple; tips of apical cilia whitish. Hindwings light grey.

Gloucester, Lancashire, local; Germany, Switzerland; 5, 8. Larva pale yellowish: in irregular galleries in leaves of *Tilia;* 7, 9, 10.

6. **N. anomalella**, *Gz.* 5-6 mm. Head ferruginous-orange to black, collar yellow-whitish. Antennal eyecaps whitish. Forewings shining greenish-bronzy, lighter posteriorly, apical fourth purple. Hindwings grey.

England, E. Ireland, common; C. Europe; 5, 8. Larva yellowish: in long irregular galleries in leaves of rose; 7, 9, 10.

7. **N. viscerella**, *Stt.* 4-5 mm. Head ferruginous-yellowish mixed with fuscous, collar pale yellowish. Antennal eyecaps yellow-whitish. Forewings somewhat shining bronzy-brownish, towards apex darker. Hindwings grey.

England to Durham, rather local; Germany; 5, 8. Larva green: in strongly contorted galleries in leaves of elm; 7, 9, 10.

8. **N. aucupariae**, *Fr.* 4-5 mm. Head ochreous-yellow, sometimes fuscous-mixed, collar pale yellowish. Antennal eyecaps whitish. Forewings shining bronzy, apical fourth purplish-fuscous; tips of apical cilia grey-whitish. Hindwings light grey.

Lancashire, Sutherland, local; C. Europe; 5, 8. Larva green: in strongly contorted galleries in leaves of *Pyrus aucuparia;* 7, 9.

9. **N. minusculella**, *HS.* 4-5 mm. Head black, collar white. Antennal eyecaps white. Forewings shining pale bronzy,

towards apex more brownish, hardly purple-tinged. Hindwings grey.

England to Lancashire, local; C. Europe; 5, 7. Larva green: in irregular galleries in leaves of pear; 6, 8.

10. **N. pyri**, *Glitz.* 4-5 mm. Head ferruginous, collar pale yellowish. Antennal eyecaps yellow-whitish. Forewings shining greenish-bronzy; base of costa purplish; apical fourth bright purple, apex with deep blue reflections. Hindwings grey.

Hereford, local; Germany, Switzerland; 5, 8. Larva green: in strongly contorted galleries in leaves of pear; 7, 10.

11. **N. oxyacanthella**, *Stt.* 4-5 mm. Head ferruginous-orange, collar ochreous-whitish. Antennal eyecaps ochreous-whitish. Forewings rather shining deep fuscous-purple. Hindwings grey.

England to Durham, E. Ireland, common; C. Europe; 5, 8. Larva green; head dark grey or blackish: in long irregular galleries in leaves of hawthorn; 7, 9, 10.

12. **N. desperatella**, *Fr.* 4-5 mm. Head ferruginous-orange, collar dark bronzy-fuscous. Antennal eyecaps whitish-ochreous. Forewings deep shining fuscous-bronzy, coppery-tinged. Hindwings light grey.

Hereford, Lancashire, local; Germany, Switzerland; 5, 8. Larva green: in strongly contorted galleries in leaves of apple; 7, 9, 10.

13. **N. nylandriella**, *Tgstr.* 3-5 mm. Head ferruginous-yellowish to brown, collar whitish. Antennal eyecaps whitish. Forewings light shining ochreous-grey, apex somewhat darker. Hindwings pale grey.

Cambridge, Lancashire, Sutherland, local; N. Europe, Germany; 5, 7. Larva green: in irregular galleries in leaves of *Pyrus aucuparia;* 6, 8, 9.

14. **N. torminalis**, *Wood.* 4-5 mm. Head black, collar whitish. Antennal eyecaps white. Forewings pale golden-brown; apical fourth purple, preceded by a broad straight anteriorly ill-defined brassy fascia. Hindwings dark grey.

Hereford, very local; not recorded elsewhere; 6. Larva pale yellowish; head blackish: in a broad contorted gallery in leaves of *Pyrus torminalis;* 7.

15. **N. regiella**, *HS.* 4-5 mm. Head ferruginous-orange, collar dark fuscous. Antennal eyecaps ochreous-whitish. Forewings shining brownish-golden, suffused with purplish, apex more purple; a broad straight shining brassy fascia beyond middle. Hindwings dark fuscous.

Kent, Hereford, Lancashire, York, local; Germany, Switzerland; 5, 6, 8. Larva yellowish; head pale brown, with dark brown spots: in blotches in leaves of hawthorn; 7, 9, 10.

16. **N. aeneofasciella**, *HS.* 5-6 mm. Head black. Antennal eyecaps white. Forewings shining brassy; a deep purple basal fascia; a shining silvery fascia beyond middle, preceded by a purple fascia, apical area beyond this deep purple. Hindwings grey.

England to Lancashire, local; Germany, Switzerland; 5, 8. Larva yellow: in blotches in leaves of *Agrimonia eupatorium;* 7, 9, 10.

17. **N. fragariella**, *Heyd.* (*gei*, Wk.) 4-5 mm. Head brown to ferruginous-orange, collar darker. Antennal eyecaps whitish. Forewings shining golden-bronzy; a shining pale golden fascia beyond middle, preceded by a purple fascia, apical area beyond this deep purple. Hindwings grey.

Dorset, Lancashire, local; Germany; 5, 8. Larva brownish-yellow; head darker, with two deeper lines: in long slender contorted galleries in leaves of *Fragaria*, *Geum*, and *Agrimonia;* 7, 10. British records of *N. dulcella*, Hein., seem to have been founded erroneously on specimens of this species.

18. **N. splendidissimella**, *HS.* 4-5 mm. Head black. Antennal eyecaps white. Forewings dark coppery-purple-brown; a suffused brassy basal patch; a straight shining pale golden fascia beyond middle. Hindwings grey.

Kent, Lancashire, Westmoreland, local; C. Europe; 5, 8. Larva deep yellow: in long irregular galleries in leaves of *Rubus fruticosus;* 7, 9, 10.

19. **N. auromarginella**, *Rich.* 5-6 mm. Head ferruginous-orange. Antennal eyecaps ochreous-whitish. Forewings deep shining golden-bronze; a shining golden-silvery fascia beyond middle, edged anteriorly with purple suffusion, apical area beyond this deep purple; an apical shining golden-silvery fascia, partly in cilia. Hindwings grey.

Dorset, local; not recorded elsewhere; 5, 8, 9. Larva yellowish: in irregular galleries in leaves of *Rubus fruticosus;* 7, 10.

20. **N. aurella**, *Stt.* 6-7 mm. Head ferruginous-orange. Antennal eyecaps ochreous-whitish. Forewings shining coppery-golden; a shining pale golden fascia beyond middle, preceded by a purplish or dark purple-fuscous fascia, apical area beyond this dark purple-fuscous. Hindwings rather dark grey.

England, Ireland, very common; C. Europe, N. Africa; 5, 6, 8. Larva light yellowish: in long irregular galleries in leaves of *Rubus fruticosus;* 7, 9-3. Supposed British specimens of *N. Tengstroemi*, Nolck., would seem to have been dwarfed examples of this species.

21. **N. filipendulae,** *Wk.* (*serella*, Stt.) 4-5 mm. Head ferruginous to dark fuscous. Antennal eyecaps yellow-whitish. Forewings shining golden-brown, sometimes purplish-tinged; a pale golden-metallic vertical fascia beyond middle; apical area beyond this dark purple-fuscous. Hindwings grey.

Sussex, York to Perth, on downs and moors, local; Germany; 5, 8. Larva deep yellow; head shining brown: in galleries along margin of leaflets of *Spiraea filipendula* and *Potentilla tormentilla*, in small leaflets becoming a spiral blotch filling the whole; 7, 9, 10.

22. **N. poterii,** *Stt.* 3-5 mm. Head ferruginous. Antennal eyecaps whitish. Forewings golden-bronzy; a pale golden-metallic slightly inwards-oblique fascia beyond middle; apical area beyond this dark purple-fuscous. Hindwings grey.

Surrey, Dorset, Lancashire, local; not recorded elsewhere; 5, 7. Larva yellow: in galleries becoming spiral blotches in leaves of *Poterium sanguisorba;* 6, 8, 9.

23. **N. acetosae,** *Stt.* 3-5 mm. Head fuscous to blackish. Antennal eyecaps whitish. Forewings shining bronzy; a broad shining silvery fascia at $\frac{3}{4}$, preceded by a fuscous suffusion; apical area beyond this rather dark purplish-fuscous. Hindwings grey.

I. of Wight, E. Ireland, local; Germany; 5, 8. Larva yellow: in galleries becoming spiral blotches in leaves of *Rumex acetosella;* 7, 9.

24. **N. gratiosella,** *Stt.* 4-5 mm. Head black. Antennal eyecaps white. Forewings shining brownish-golden; a shining silvery fascia at $\frac{2}{3}$, sometimes preceded by a purple suffusion; apical area beyond this deep purple. Hindwings dark grey.

Britain to the Clyde, E. Ireland, common; Germany, Switzerland; 5, 6. Larva green; head whitish-brown: in irregular galleries in leaves of hawthorn; 7, 8.

25. **N. ulmivora,** *Hein.* 4-5 mm. Head black. Antennal eyecaps white. Forewings shining dark coppery-golden, costa deep purple; a shining silvery fascia beyond middle; apical area beyond this deep purple-fuscous. Hindwings rather dark grey.

Surrey, Hereford, Lancashire, local; Belgium, Germany; 5, 8. Larva green: in irregular galleries in leaves of elm; 7, 9, 10.

26. **N. prunetorum**, *Stt.* 4-5 mm. Head black, collar whitish. Antennal eyecaps white. Forewings shining light greenish-brassy-bronze, base purplish-tinged; a rather broad shining silvery fascia beyond middle, preceded by a dark fuscous fascia, apical area beyond this blackish. Hindwings grey.

Bucks, Cambridge, Hereford, Lancashire, local; C. Europe; 5, 8. Larva grey-green: in galleries at first spirally coiled, afterwards extending round leaves of blackthorn and sometimes cherry; 7, 9, 10.

27. **N. marginicolella**, *Stt.* 5-6 mm. Head in ♂ black, in ♀ orange, collar blackish. Antennal eyecaps whitish. Forewings shining brownish-golden; a somewhat oblique shining silvery fascia beyond middle, preceded by a brownish-purple suffusion, apical area beyond this dark purple-fuscous. Hindwings dark fuscous.

England to Durham, E. Ireland, common; C. Europe; 5, 8. Larva light yellowish: in long irregular galleries in leaves of elm; 7, 9, 10.

28. **N. alnetella**, *Stt.* 4-5 mm. Head orange, collar deep bronzy-fuscous. Antennal eyecaps white. Forewings golden-brown, becoming lighter golden towards dorsum anteriorly; a bright shining silvery fascia beyond middle, preceded by a dark purplish-fuscous suffusion, apical area beyond this dark purplish-fuscous. Hindwings grey.

England to Durham, common; C. Europe; 5, 6, 8. Larva yellow: in long irregular galleries in leaves of alder; 7, 9, 10.

29. **N. continuella**, *Stt.* 4-5 mm. Head ferruginous-orange, collar light yellowish. Antennal eyecaps whitish-ochreous. Forewings fuscous-bronzy; a shining silvery fascia beyond middle, preceded by a rather dark purplish-fuscous fascia, apical area beyond this dark fuscous-purple. Hindwings grey.

Kent, Cambridge, Hereford, Lancashire, local; Holland, Germany; 5, 6, 8. Larva yellow (appearing green in the mine); head pale: in long irregular galleries, filled with greenish excrement, in leaves of birch; 7, 9, 10.

30. **N. centifoliella**, *Z.* 4-5 mm. Head ferruginous-orange, collar light yellowish. Antennal eyecaps ochreous-whitish. Forewings rather dark fuscous, slightly tinged with bronzy or purplish; a shining whitish fascia beyond middle; apical area beyond this more purple-tinged. Hindwings grey.

Dorset, Herts, Lancashire, local; Germany; 5, 8. Larva yellow: in long irregular galleries in leaves of rose; 7, 10.

31. **N. Hodgkinsoni**, *Stt.* 5-6 mm. Head black. Antennal

eyecaps white. Forewings shining golden-brown or bronzy-golden; a shining pale golden or golden-silvery fascia beyond middle; apical area beyond this deep purple. Hindwings grey.

Cheshire, Lancashire, local; not recorded elsewhere; 5, 8. Larva in irregular galleries in leaves of rose; 7, 9, 10.

32. **N. microtheriella**, *Stt.* 3-4 mm. Head ochreous-yellowish, collar ochreous-whitish. Antennal eyecaps ochreous-whitish. Forewings purplish-fuscous; a rather oblique shining whitish fascia beyond middle; apical area beyond this darker and more purple. Hindwings grey.

England, common; C. Europe; 5, 8. Larva pale greenish-yellow: in very long narrow irregular galleries in leaves of hazel and hornbeam; 7, 9, 10.

33. **N. betulicola**, *Stt.* 4-5 mm. Head in ♂ ochreous-yellowish, in ♀ more orange, collar light yellowish. Antennal eyecaps yellow-whitish. Forewings shining deep purplish-bronzy; a shining golden-silvery fascia about $\frac{3}{4}$; apical area beyond this deep fuscous-purple. Hindwings grey.

Britain to Caledonian Canal, common; Germany, Switzerland; 5, 8. Larva yellow, with a series of brownish linear marks; head brown: in irregular galleries, usually half filled with excrement, in leaves of birch (especially near the ground); 7, 9, 10.

34. **N. plagicolella**, *Stt.* 4-5 mm. Head orange, collar dark bronzy-fuscous. Antennal eyecaps whitish. Forewings shining deep purplish-bronzy; a shining whitish fascia beyond middle; apical area beyond this dark purple-fuscous. Hindwings grey.

England to Durham, E. Ireland, common; C. Europe; 5, 8. Larva pale yellow: in whitish blotches terminating short fine galleries in leaves of blackthorn; 7, 9, 10.

35. **N. ignobilella**, *Stt.* 4-5 mm. Head orange, collar dark bronzy-fuscous. Antennal eyecaps whitish. Forewings shining brownish-golden; a somewhat shining yellow-whitish fascia beyond middle; apical area beyond this purplish-bronzy. Hindwings light grey.

Britain to Stirling, E. Ireland, local; Holland; 5, 8. Larva yellowish; head blackish: in blotches in leaves of hawthorn; 7, 9, 10.

36. **N. distinguenda**, *Hein.* 3-5 mm. Head ochreous-yellowish, collar light yellowish. Antennal eyecaps yellow-whitish. Forewings somewhat shining bronzy-fuscous; a somewhat oblique shining whitish fascia beyond middle; apical area

beyond this darker, faintly purplish-tinged. Hindwings light grey.

Sussex, local; Germany; 5, 8. Larva yellow, with a series of black linear marks; head black: in small irregular galleries, filled with brown excrement, in leaves of birch; 7, 9, 10.

37. **N. glutinosae**, *Stt.* 4-5 mm. Head ochreous-yellowish or orange, collar yellow-whitish. Antennal eyecaps yellow-whitish. Forewings bronzy-fuscous, sometimes purplish-tinged; a narrow whitish fascia beyond middle; apical area beyond this dark purplish-fuscous. Hindwings light grey.

Suffolk to Lancashire and Durham, local; Holland, Germany; 5, 8. Larva yellow: in irregular galleries in leaves of alder; 7, 10.

38. **N. luteella**, *Stt.* 4-5 mm. Head pale yellowish to fuscous, collar whitish. Antennal eyecaps whitish. Forewings bronzy-fuscous; a somewhat shining yellow-whitish fascia beyond middle, narrowed or sometimes obsolete on costa; apical area beyond this purple-fuscous. Hindwings grey.

England to Durham, common; Germany; 5, 8. Larva yellow; head pale brownish: in small irregular galleries, usually nearly filled with irregular excrement, in leaves of birch; 7, 9, 10.

39. **N. sorbi**, *Stt.* 6-8 mm. Head ochreous-yellowish to fuscous. Antennal eyecaps whitish. Forewings bronzy-fuscous; a broad somewhat shining whitish fascia beyond middle; apical area beyond this rather dark purplish-fuscous. Hindwings light grey.

Lancashire to Stirling, common; N. and mountains of C. Europe; 6. Larva green-whitish: in blotches terminating short galleries in leaves of *Pyrus aucuparia;* 7-9.

40. **N. argentipedella**, *Z.* (*woolhopiella*, Stt.) 5-7 mm. Head in ♂ blackish or dark fuscous, in ♀ ferruginous-yellowish. Antennal eyecaps white. Forewings blackish, purplish-tinged; a somewhat shining rather oblique anteriorly subconcave whitish fascia hardly beyond middle, sometimes interrupted. Hindwings grey.

Britain to the Clyde, E. Ireland, common; N. and C. Europe; 5, 6. Larva pale greenish: in blotches in leaves of birch; 7-10.

41. **N. tityrella**, *Stt.* 5-7 mm. Head ochreous-yellowish. Antennal eyecaps whitish. Forewings shining bronzy-brown; a rather oblique shining golden-silvery fascia beyond middle; apical area beyond this dark bronzy-brown. Hindwings grey; in ♂ with an expansible pencil of blackish hairs at base of costa.

England, common; C. Europe; 5, 8. Larva pale greenish-yellow; head black: in irregular galleries in leaves of beech; 7, 9, 10.

[*N. castanella*, Edleston, only described as "something allied to *tityrella*, but with fascia straighter and placed nearer hind-margin; two specimens taken in Lancashire among Spanish chestnut (*Castanea*)," cannot be regarded as a recognisable species.]

42. **N. malella**, *Stt.* 4-5 mm. Head ferruginous-ochreous, collar whitish. Antennal eyecaps whitish. Forewings dark fuscous; a shining white fascia beyond middle. Hindwings grey.

England to Durham, local; C. Europe; 5, 8. Larva yellow: in long irregular galleries in leaves of apple; 7, 9, 10.

43. **N. agrimoniella**, *HS.* 5-7 mm. Head ferruginous-ochreous to brown, collar dark brown. Antennal eyecaps yellow-whitish. Forewings grey densely irrorated with blackish; a narrow curved sometimes interrupted shining white fascia in middle; outer half of cilia beyond a black line white. Hindwings light grey.

Sussex, local; Germany; 5, 6. Larva yellow: in long irregular galleries in leaves of *Agrimonia eupatorium;* 9-11. Pupa within the mine.

44. **N. atricollis**, *Stt.* 4-5 mm. Head ferruginous-orange, collar dark brown. Antennal eyecaps white. Forewings black; a shining silvery sometimes interrupted fascia slightly beyond middle; outer half of cilia beyond a black line white. Hindwings grey.

Kent to Lancashire and York, local; Germany; 5, 8. Larva pale greenish; head and plate of 2 blackish: in blotches in leaves of apple and hawthorn; 7, 9, 10.

45. **N. angulifasciella**, *Stt.* 5-6 mm. Head pale ochreous. Antennal eyecaps ochreous-white. Forewings black; a somewhat bent sometimes interrupted shining silvery fascia in middle; outer half of cilia beyond a black line white. Hindwings grey.

England to Durham, common; Germany; 6, 7. Larva green-whitish: in galleries becoming spiral blotches in leaves of rose; 9-11.

46. **N. rubivora**, *Wk.* 4-5 mm. Head black or sometimes ferruginous-brownish. Antennal eyecaps white. Forewings black; a somewhat bent shining silvery fascia hardly beyond middle; outer half of cilia beyond a black line whitish. Hindwings grey.

Essex to Lincoln, local; Germany; 6. Larva green-whitish: in blotches in leaves of *Rubus fruticosus;* 10.

47. **N. arcuatella**, *HS.* (*arcuosella*, Dbld.) 4-5 mm. Head ochreous-yellowish to fuscous. Antennal eyecaps white. Forewings blackish; an oblique somewhat curved shining silvery fascia in middle; outer half of cilia beyond a blackish line grey-whitish. Hindwings grey.

England to Westmoreland, local; Germany, Switzerland; 5, 8. Larva pale greenish: in long irregular galleries in leaves of *Potentilla fragariastrum* and *P. tormentilla;* 7, 9, 10.

48. **N. fulgens**, *Stt.* 5-6 mm. Head light ochreous-yellowish. Antennal eyecaps whitish. Forewings deep shining bronzy; a golden-tinged silvery-metallic hardly oblique fascia at $\frac{2}{3}$; apical area beyond this dark purple-fuscous; cilia round apex beyond a blackish median line white. Hindwings rather dark grey.

Lancashire, Westmoreland, local; not recorded elsewhere; 5, 8. Larva pale greenish-yellow; head pale brown: in long irregular galleries in leaves of beech; 7, 9, 10.

49. **N. myrtillella**, *Stt.* 4-5 mm. Head ferruginous-yellowish, collar paler. Antennal eyecaps whitish. Forewings dark fuscous, faintly purplish-tinged; a rather oblique somewhat shining whitish fascia beyond middle; outer half of cilia ochreous-white. Hindwings light grey.

Hereford to Perth, common; Germany; 5, 8. Larva yellow: in irregular galleries in leaves of *Vaccinium myrtillus;* 7, 9, 10.

50. **N. salicis**, *Stt.* (*diversa*, Glitz.) 5-6 mm. Head ferruginous-orange, collar paler. Antennal eyecaps whitish. Forewings fuscous or dark fuscous, faintly purplish-tinged, somewhat sprinkled with pale yellowish; an ochreous-whitish rather oblique fascia beyond middle; apical area beyond this sometimes more blackish; outer half of cilia ochreous-white. Hindwings grey.

Britain to the Clyde, common; C. Europe; 5, 8. Larva yellowish: in narrow irregular blotches in leaves of *Salix*, especially *S. caprea;* 7, 9, 10. Supposed British examples of *N. vimineticola*, Fr., would seem to have been pale specimens of this species.

51. **N. floslactella**, *Hw.* 5-7 mm. Head ferruginous-yellowish, collar paler. Antennal eyecaps yellow-whitish. Forewings dark fuscous, mixed or almost wholly suffused with pale ochreous-yellowish; a pale ochreous-yellowish oblique fascia beyond middle; apical area beyond this dark fuscous, faintly purplish-

tinged; apical cilia ochreous-white except at base. Hindwings light grey.

Britain to the Clyde, common; C. Europe; 5, 8. Larva pale yellowish: in rather broad irregular galleries in leaves of hazel and hornbeam; 7, 9, 10.

52. **N. lapponica,** *Wk.* 6-7 mm. Head ferruginous-orange to blackish. Antennal eyecaps whitish. Forewings light fuscous; a somewhat oblique shining whitish-ochreous fascia at $\frac{2}{3}$; apical area beyond this darker purple-fuscous; cilia round apex ochreous-whitish except at base. Hindwings light grey.

Sussex, Hereford, York to Westmoreland, local; N. Europe; 5, 7. Larva yellow; head blackish: in long angular galleries in leaves of birch; 6, 9.

53. **N. confusella,** *Wlsm.* 5-6 mm. Head ochreous-yellow. Antennal eyecaps whitish. Forewings fuscous, faintly purplish-tinged, especially posteriorly; a hardly oblique whitish fascia at $\frac{2}{3}$; outer half of cilia whitish. Hindwings light grey.

Sussex, Norfolk, Hereford, local;[1] not recognised elsewhere; 5. Larva green-whitish; head pale yellowish: in long angular galleries in leaves of birch; 7.

54. **N. septembrella,** *Stt.* 5-6 mm. Head ferruginous-ochreous, collar whitish. Antennal eyecaps whitish. Posterior tarsi whitish. Forewings dark fuscous, somewhat pale-sprinkled; a subtriangular whitish tornal spot; tips of apical cilia whitish. Hindwings grey.

England to Durham, E. Ireland, common; C. Europe; 5, 8. Larva pale yellowish: in galleries becoming convoluted blotches in leaves of *Hypericum;* 7, 9, 10. Pupa within the mine.

55. **N. catharticella,** *Stt.* 5-6 mm. Head ferruginous-orange, collar whitish. Antennal eyecaps whitish. Posterior tarsi whitish, spotted with dark fuscous. Forewings dark fuscous, faintly purplish-tinged; a roundish white tornal spot; outer half of cilia white. Hindwings grey.

England to York, local; C. Europe; 5, 8. Larva green: in rather broad irregular galleries in leaves of *Rhamnus catharticus;* 7, 9, 10.

56. **N. intimella,** *Z.* 5-6 mm. Head ferruginous-orange, collar whitish. Antennae wholly ochreous-whitish. Forewings blackish or dark fuscous, faintly purplish-tinged; an ochreous-whitish dorsal spot hardly beyond middle; tips of apical cilia white. Hindwings grey.

---

[1] Quite recently published; I have not seen specimens.

England to Westmoreland, local; Germany, Switzerland; 6. Larva in blotches in leaves of *Salix caprea* and *S. fragilis;* 10.

57. **N. Weaveri,** *Stt.* 6-8 mm. Head ferruginous-ochreous, collar whitish-ochreous. Antennal eyecaps whitish. Forewings black, bases of scales grey; an oblique spot on costa before middle, and a tornal spot shining whitish; outer half of apical cilia whitish. Hindwings grey.

Pembroke, York to Perth, local; C. Europe; 6. Larva yellow: in blotches in leaves of *Vaccinium vitis-idaea;* 4, 5. Pupa within the mine.

58. **N. sericopeza,** *Z.* 5-8 mm. Head ferruginous-orange, collar ochreous-whitish. Antennal eyecaps ochreous-whitish. Forewings blackish; a basal spot, a bent fascia before middle, a tornal spot, and opposite costal spot yellow-whitish. Hindwings grey.

Kent, Cambridge, Gloucester, local; Germany, Italy; 5, 7, 9. Larva in seed vessels of maple; 6, 8, 10.

59. **N. quinquella,** *Bed.* 5-6 mm. Head dark fuscous. Antennal eyecaps whitish. Forewings dark bronzy-fuscous; a transverse spot on costa before middle, a triangular spot on dorsum before tornus, and a discal spot at $\frac{3}{4}$ shining silvery-white. Hindwings rather dark grey.

Kent to Cambridge, local; not recorded elsewhere; 6, 7. Larva greenish, with a series of dark spots: in slender excessively contorted galleries in leaves of oak; 11. Over 120 larvae have been counted in a single leaf.

60. **N. trimaculella,** *Hw.* 5-6 mm. Head ochreous-yellowish, collar whitish. Antennal eyecaps whitish. Abdomen of ♂ yellowish, crimson-tinged. Forewings dark fuscous; a broad median longitudinal patch extending from base to near middle, and large opposite sometimes confluent triangular costal and dorsal spots beyond middle whitish-yellowish. Hindwings grey.

England to Durham, local; C. Europe; 5, 8. Larva pale greenish-yellow: in irregular galleries in leaves of poplar; 7, 9, 10.

61. **N. assimilella,** *Z.* 4-5 mm. Head ferruginous, collar whitish. Antennal eyecaps whitish. Forewings dark fuscous; a small basal spot, a large roundish discal spot at $\frac{1}{3}$, a dorsal spot before tornus, and a small spot somewhat before it on costa whitish; outer half of cilia ochreous-white. Hindwings grey.

Sussex, local; C. Europe; 6, 8. Larva pale greenish: in irregular galleries in leaves of *Populus tremula;* 7, 9.

62. **N. subbimaculella,** *Hw.* 5-6 mm. Head orange. An-

tennal eyecaps whitish. Forewings dark fuscous; a small basal spot, another on middle of costa, and a larger triangular spot on dorsum before tornus ochreous-whitish; tips of apical cilia whitish. Hindwings grey.

England, common; C. Europe; 6. Larva whitish-green: in blotches in leaves of oak; 9, 10.

63. **N. argyropeza**, *Z.* 5-6 mm. Head ochreous-yellow, collar whitish. Antennal eyecaps whitish. Forewings dark fuscous; a small costal spot before middle, and a larger dorsal spot before tornus whitish; outer half of cilia whitish. Hindwings grey.

England to York, local; Germany; 5.

64. **N. apicella**, *Stt.* 6-7 mm. Head ochreous-yellowish, collar whitish. Antennal eyecaps whitish. Forewings blackish, bases of scales grey-whitish, towards base sometimes suffused with whitish; an ill-defined triangular spot on middle of costa, and another on dorsum opposite whitish; outer half of cilia whitish. Hindwings light grey.

England to Lancashire, local; C. Europe; 5, 6. Larva pale yellowish: in leaf-stalks, afterwards in blotches in leaves of *Populus tremula;* 7-11.

65. **N. headleyella**, *Stt.* 4-6 mm. Head reddish-fuscous to dark fuscous, sometimes mixed with yellowish. Antennal eyecaps whitish. Forewings blackish-fuscous; a silvery-grey basal blotch extending to $\frac{1}{3}$; a triangular spot on costa beyond middle and another on dorsum opposite silvery-metallic; tips of cilia grey-whitish. Hindwings grey.

Surrey, Sussex, Wilts, York, local; not recorded elsewhere; 6, 8. Larva yellow; head pale brown: in galleries becoming blotches in leaves of *Prunella vulgaris;* 7, 9, 10.

66. **N. pulverosella**, *Stt.* 6-7 mm. Head ferruginous-yellowish. Antennal eyecaps whitish. Forewings shining pale ochreous-greyish, coarsely irrorated with dark fuscous; outer part of apical cilia whitish. Hindwings light grey.

England to York, rather local; Germany; 5, 6. Larva yellowish: in blotches in leaves of apple; 6, 7.

67. **N. cryptella**, *Stt.* 4-5 mm. Head ferruginous-yellowish, sometimes mixed with fuscous. Antennal eyecaps whitish. Forewings pale greyish, coarsely irrorated with dark fuscous; outer part of cilia whitish-grey. Hindwings grey.

Britain to the Clyde, local; Germany, Switzerland; 6, 8. Larva pale yellow-greenish: in blotches in leaves of *Lotus corniculatus;* 7, 9.

2. TRIFURCULA, *Z.*

Head rough. Tongue rudimentary. Antennae $\frac{2}{3}$, in ♂ simple, basal joint enlarged and concave beneath to form eyecap. Labial palpi short, filiform, drooping. Maxillary palpi long, filiform, folded. Posterior tibiae with bristles above; middle-spurs below middle. Forewings: 1b simple, 4 absent, 5 absent, cell open between 6 and 10, 7-9 absent. Hindwings $\frac{2}{3}$, lanceolate, cilia $2\frac{1}{2}$-3; cell open between 2 and 5, 3 absent, 4 absent, 5 and 6 stalked.

A genus of few species, apparently restricted to Europe; correlated with *Nepticula.* Imago with forewings lanceolate. Larva hardly known.

1. Head black . . . 1. *atrifrontella.*
,, more or less yellowish . . . 2.
2. Forewings irrorated with fuscous . 2. *immundella.*
,, ,, with pale ochreous . 3. *pallidella.*

1. **T. atrifrontella,** *Stt.* 7-9 mm. Head blackish. Antennal eyecaps whitish. Forewings pale greyish-ochreous, coarsely irrorated with dark fuscous. Hindwings grey.

Kent, Surrey, Dorset, local; Germany; 7, 8. Has been recorded as bred from hawthorn, but unconfirmed.

2. **T. immundella,** *Z.* (*squamatella,* Stt.) 7-8 mm. Head ochreous-yellowish, mixed with fuscous. Antennal eyecaps whitish. Forewings ochreous-grey-whitish, coarsely irrorated with fuscous. Hindwings grey.

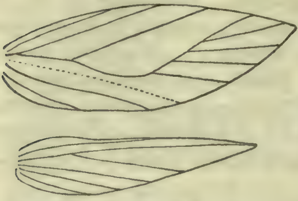
England to Durham, amongst *Cytisus scoparius,* common; C. Europe, N. Africa; 7, 8.

3. **T. pallidella,** *Z.* 7-9 mm. Head pale yellowish. Antennae wholly whitish-yellowish. Forewings shining whitish-yellowish, coarsely irrorated with pale ochreous. Hindwings whitish-grey.

Dorset, Herts, Lancashire, Westmoreland, amongst *Genista tinctoria,* local; C. and SE. Europe, Asia Minor; 8, 9.

3. SCOLIAULA, *n.g.*

Head rough. Tongue rudimentary. Antennae $\frac{2}{3}$, in ♂ simple, basal joint enlarged and concave beneath to form eyecap. Labial palpi short, filiform, rather drooping. Maxillary palpi long, filiform, folded. Posterior tibiae with bristles above; middle-spurs slightly above middle. Forewings: 1b simple, lower margin of cell obsolete, upper margin curved downwards below middle of disc, 2 absent, 3 absent, 4-7 appearing to rise out of 8, 9 absent. Hindwings over $\frac{1}{2}$, lanceolate, cilia $2\frac{1}{2}$; cell open between 2 and 6, 3-5 absent.



Neuration of *Scoliaula quadrimaculella.*

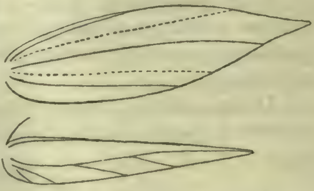
Only the one species is known; it must closely approach the common ancestral form of the two preceding genera. Its own origin is obscure, but may probably be referred to a very early form of the family, allied to *Tinea* and preserving much of the ancestral structure. Imago with forewings lanceolate.

1. **S. quadrimaculella**, *Boh.* 7-9 mm. Head orange, collar ochreous-whitish. Antennal eyecaps ochreous-whitish. Forewings bright shining purplish-coppery; yellow-whitish costal and dorsal opposite spots beyond middle. Hindwings dark fuscous.

England to York, amongst alder, local; Holland, Sweden; 7.

4. OPOSTEGA, *Z.*

Head rough, back of crown smooth. Tongue short or absent. Antennae $\frac{4}{5}$, in ♂ simple, basal joint very greatly enlarged, dilated and concave beneath to form a large eyecap. Labial palpi short, filiform, drooping. Maxillary palpi long, filiform, folded. Abdomen more or less flattened. Posterior tibiae and first joint of tarsi with long bristles. Forewings: 1b simple, cell open between 2 and 11, 3-10 all absent; lower surface with large basal denuded patch below costa. Hindwings $\frac{1}{3}$-$\frac{1}{2}$, narrow-lanceolate, beneath with median pecten of stiff scales towards base, cilia 3-5; transverse vein absent between 2 and 5, 3 absent, 4 absent.



Neuration of *Opostega crepusculella.*

A remarkable genus, representing the extreme of neural degeneration; its origin is exceedingly doubtful; though not large, it is probably nearly cosmopolitan, more species being at present known from Australia than elsewhere. Imago with forewings lanceolate. Larva almost unknown.

1. Forewings white . . . . . 2.
,, pale ochreous . . . 4. *spatulella*

2. Forewings with dark fuscous median dorsal mark 3.
„ without such mark . . 1. *salaciella.*
3. Forewings with dark fuscous streak from middle of costa . . 3. *crepusculella.*
„ without median costal streak 2. *auritella.*

1. **O. salaciella,** *Tr.* (*reliquella,* Z.) 9-12 mm. Forewings white; sometimes an indistinct yellowish fascia towards apex, often entirely absent. Hindwings whitish-grey.

England to Westmoreland, rather common; C. Europe; 6, 7. Has been bred from *Rumex acetosella;* larva perhaps in the flower-stems, 5. The imago flies boldly towards dusk, and comes freely to lamps.

2. **O. auritella,** *Hb.* 9-10 mm. Forewings white; a dark fuscous oblique spot on middle of dorsum; three costal and two dorsal fuscous strigulae before apex; a black apical dot. Hindwings rather dark grey.

Norfolk, Cambridge, in fens, scarce and local; Germany, Asia Minor; 6. Said to have been bred from flower-stem of *Caltha.*

3. **O. crepusculella,** *Z.* 7-10 mm. Forewings white; an oblique rather dark fuscous streak from middle of costa, and another from middle of dorsum; a fuscous ill-defined subapical fascia, followed by two darker costal strigulae; a minute black apical dot. Hindwings fuscous.

England to Durham, N. Ireland, amongst *Mentha palustris,* local; C. and S. Europe, Asia Minor, Palestine; 6, 7.

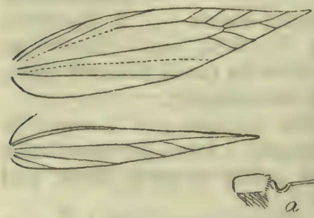
4. **O. spatulella,** *HS.* 9-11 mm. Forewings pale shining ochreous, more or less grey-sprinkled; an indistinct oblique fuscous streak from middle of costa, and a spot on middle of dorsum, each followed by somewhat pale spots. Hindwings grey.

Essex, Somerset, local; France; 8-6.

5. BUCCULATRIX, *Z.*

Head roughly tufted above, face smooth. Tongue short. Antennae nearly 1, in ♂ simple, basal joint enlarged and dilated with scales and concave beneath to form eyecap; in ♂ with deep notch and sinuation in stalk above basal joint. Labial and maxillary palpi rudimentary. Posterior tibiae hairy. Forewings: 1b simple, 3 absent, 4 absent, 5 sometimes absent, 6 and 7 stalked, 7 to costa, 8 sometimes absent. Hindwings $\frac{2}{3}$, narrow-lanceolate, cilia 3; transverse vein absent between 2 and 5, 3 absent, 4 absent.

A rather limited genus, but occurring throughout the Northern hemisphere and in Australia. With the following genus, it represents in Europe a group of genera (*Erechthias* and its allies) which is especially developed in Australia and New Zealand. The peculiar antennal structure recurs in *Comodica*, a genus of this group. Imago with forewings lanceolate. Larva mining in leaves when young, afterwards rather rough-skinned, feeding externally on surface of leaves. Pupa in an elongate ribbed cocoon.



Neuration of *Bucculatrix nigricomella*; *a*, basal portion of antenna of ♂.

1. Forewings unicolorous . . 1. *cristatella*.
,, not unicolorous . . . 2.
2. Forewings yellow . . . . 8. *thoracella*.
,, not yellow . . . . . 3.
3. Forewings dark with two pairs of pale markings . 4.
,, light with dark markings . . 7.
4. Head dark fuscous . . 2. *nigricomella*.
,, at most mixed with dark fuscous . . 5.
5. Forewings dark fuscous . . . 7. *cidarella*.
,, not dark fuscous . . . 6.
6. Plical and second discal stigmata black . 3. *maritima*.
,, ,, ,, ,, obsolete 11. *demaryella*.
7. Head more or less ferruginous . . 9. *ulmella*.
,, not ferruginous-tinged . . . 8.
8. Forewings with two dark costal spots . 4. *artemisiae*.
,, ,, three dark costal spots . . 9.
9. Head pale fuscous . . . 10. *crataegi*.
,, white . . . . . 10.
10. Forewings with blackish apical dash . 6. *boyerella*.
,, without blackish apical dash . 5. *frangulella*.

1. **B. cristatella**, *Z.* 6-7 mm. Head ochreous-yellowish to light yellowish-fuscous. Forewings shining ochreous-grey. Hindwings grey.

England to Westmoreland, rather local; C. Europe; 6, 8. Larva pale greenish; dorsal and subdorsal lines darker; dots whitish; head pale brown; plate of 2 yellowish, brown-dotted: on *Achillea millefolium*; 4, 5, 7.

2. **B. nigricomella**, *Z.* (*aurimaculella*, Stt.) 7-8 mm. Head dark fuscous. Antennal eyecaps whitish. Forewings shining

greyish-bronzy; pairs of costal and dorsal undefined ochreous-whitish spots before middle and at $\frac{2}{3}$. Hindwings rather dark grey.

England to Cumberland, common; C. Europe, Asia Minor; 5, 6, 8. Larva greenish or yellowish; head pale brown; 2 black-speckled: on *Chrysanthemum leucanthemum;* 3, 4, 7. On the Continent the usual form of the imago is almost unicolorous, the spots being nearly or quite obsolete, but this form does not seem to have occurred in England.

3. **B. maritima,** *Stt.* 8-9 mm. Head pale greyish-ochreous, centre sometimes fuscous. Forewings light greyish-ochreous, more or less irrorated with fuscous; a short median streak from base, pairs of costal and dorsal undefined spots before middle and at $\frac{3}{4}$ whitish, often very indistinct; plical and second discal stigmata minute, black. Hindwings rather dark grey.

England, E. Ireland, in salt-marshes, common; Germany, Finland; 6, 8. Larva pale greyish-green; dorsal line darker; head yellowish; 2 yellowish-grey, blackish-dotted: on *Aster tripolium,* mining long galleries until nearly full-grown; 4, 5, 7.

4. **B. artemisiae,** *HS.* 7-9 mm. Head fuscous, sides usually whitish. Forewings whitish or ochreous-grey-whitish, often much irrorated with fuscous; a streak along fold from base to before middle, a short longitudinal streak in disc before middle, an oblique streak from dorsum beyond middle, two oblique streaks from costa posteriorly, and a tornal suffusion brownish-ochreous or fuscous; second discal stigma small, blackish. Hindwings grey.

Kent (Folkestone), once bred; Germany, Finland; 5, 6, 8. Larva greenish-grey; dorsal and subdorsal lines darker; head brown; 2 black-dotted: on *Artemisia campestris* (but the English example was bred from *Achillea millefolium*); 4, 5, 7.

5. **B. frangulella,** *Gz.* 7-8 mm. Head white, sometimes fuscous-mixed in middle. Forewings white, sometimes more or less sprinkled with fuscous; oblique costal spots before and beyond middle, a third at apex, and one on middle of dorsum brownish-ochreous irrorated with dark fuscous; plical and second discal stigmata black. Hindwings grey.

England to Westmoreland, rather common; N. and C. Europe; 6, 7. Larva pale yellowish-green, anteriorly pinkish-tinged; dorsal line darker; head pale brown; 2 brown-marked above: on *Rhamnus frangula;* 8, 9.

6. **B. boyerella,** *Dup.* 8-9 mm. Head white, sometimes

fuscous-mixed in middle. Forewings white, sprinkled with dark ochreous-fuscous; an oblique spot on costa before middle, an oblique fascia beyond middle including a blackish mark beneath, an oblique costal spot before apex terminating in a black apical dash, and an oblique anteriorly blackish-margined spot on middle of dorsum brownish-ochreous irrorated with dark fuscous. Hindwings grey.

England to York, local; C. and SE. Europe, Asia Minor; 6. Larva pale yellowish; subdorsal line dark green; dots grey; head pale brown: on elm; 8, 9.

7. **B. cidarella**, *Z.* 8-9 mm. Head dull ferruginous, mixed with fuscous in middle. Antennal eyecaps white. Forewings dark fuscous; two whitish costal spots before middle and at $\frac{3}{4}$, and two on dorsum somewhat anterior to these; cilia ochreous-tinged. Hindwings grey.

England to Cumberland, rather common; C. Europe; 5, 6. Larva yellowish-green, anteriorly reddish-tinged; dorsal line darker; dots whitish; head pale brown: on alder; 8, 9.

8. **B. thoracella**, *Thnb.* (*hippocastanella*, Dup.) 6-8 mm. Head ochreous-yellowish. Forewings light ochreous-yellow; a thick fascia near base, and large costal and dorsal median spots dark fuscous; a fine dark fuscous longitudinal line from middle of disc to apex, extending into cilia. Hindwings grey or dark grey.

Gloucester to Derby and Lancashire, local; C. Europe; 5, 7. Larva whitish-yellow, anteriorly reddish-tinged; head pale whitish-yellow: on *Tilia;* 6, 8.

9. **B. ulmella**, *Z.* (*vetustella*, Stt.) 7-8 mm. Head ferruginous, sometimes mixed with dark fuscous in middle. Antennal eyecaps ochreous-whitish. Forewings ochreous-whitish, irrorated with brown; four oblique costal spots, first and third large, and a large median dorsal spot dark fuscous; cilia more ochreous-tinged. Hindwings grey.

England to York, common; C. Europe, Asia Minor; 5, 6, 8. Larva pale grey-greenish; lateral line darker; dots whitish; head pale brown; 2 brownish-grey, black-dotted: on oak (abroad also on elm); 7, 9, 10.

10. **B. crataegi**, *Z.* (*crataegifoliella*, Dup.) 7-9 mm. Head pale fuscous, mixed in middle with blackish. Forewings brownish-whitish, irrorated with dark fuscous; a more or less distinct dark streak along fold from base to near middle, often incomplete; three oblique costal spots between $\frac{1}{3}$ and apex, and a median dorsal spot suffusedly dark fuscous: second discal stigma forming a short blackish dash. Hindwings grey.

England to Durham, E. Ireland, rather local; C. and SE. Europe, Asia Minor, N. Africa; 5, 6. Larva dull green, more yellowish above; dorsal line darker; dots yellowish; head pale brown; 2 marked with dark grey: on hawthorn; 7, 8.

11. **B. demaryella**, *Stt.* 8-9 mm. Head whitish, mixed in middle with dark fuscous. Forewings brownish-whitish, irrorated with dark fuscous; two pairs of oblique whitish costal and dorsal streaks before middle and at $\frac{3}{4}$, intermediate space dark fuscous towards costa. Hindwings grey.

Britain to Sutherland, local; not recorded elsewhere; 5, 6. Larva dull green, more whitish laterally; spots white; head brown: on birch; 8.

6. OINOPHILA, *Stph.*

Head roughly tufted on forehead, face and back of crown smooth. Tongue short. Antennae 1, in ♂ simple, basal joint rather thick, without pecten. Labial palpi rather short, filiform, drooping, second joint with some apical bristles beneath, terminal joint shorter than second, somewhat pointed. Maxillary palpi moderate, filiform, drooping. Posterior tibiae hairy. Forewings: 1b simple, 3-5 absent, 7 to costa, 8 absent, 11 absent. Hindwings $\frac{1}{2}$, narrow-lanceolate, cilia 3: transverse vein absent between 3 and 5, 4 absent, 6 absent.

Contains only the one species; apparently related to the preceding genus. Imago with forewings narrow-lanceolate, apex somewhat produced. Larva very elongate, feeding on fungus.

1. **O. v-flavum**, *Hw.* 8-12 mm. Forewings ochreous-fuscous; a slender light yellowish angulated fascia before middle, angle emitting a short longitudinal line, sometimes extended to apex; a light yellowish spot on costa before apex, and another on dorsum somewhat anterior and sometimes connected. Hindwings fuscous.

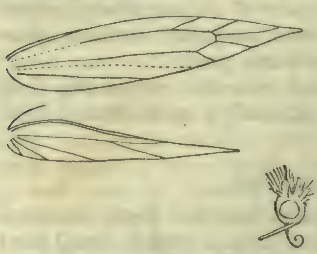
England to York, E. Ireland, local; Holland, Germany; 7, 8. Larva ochreous-whitish; head and plate of 2 pale brown: in silken galleries amongst fungus growing on walls in cellars, also said to feed on corks; 5, 6.

7. LITHOCOLLETIS, *Hb.*

Head roughly tufted on crown, face smooth. Antennae almost 1, in ♂ simple, basal joint thick, with pecten. Labial palpi moderate, porrected or drooping, filiform, pointed. Maxillary palpi rudimentary. Posterior tibiae with appressed hairs.

Forewings: 1b simple, 3-5 absent, 7 to costa, 8 absent, 10 absent. Hindwings ½, linear-lanceolate, cilia 4-5; transverse vein absent between 2 and 5, 3 absent, 4 absent, 6 absent.

A large genus, principally European, represented less freely in other parts of the Northern hemisphere, and in Australia by a single species. The species are often very closely related together and hard to discriminate, and it is possible that closer study may modify our views on the limits of some of them; experiments should be made to test the direct influence of food-plants. Imago with forewings lanceolate; in repose sitting with forepart somewhat raised. Larva stout anteriorly, usually with a yellow or orange spot on 9, without prolegs on 10, mining in leaves, seldom in bark of shoots; the mine is a small blotch, of which one surface is silk-lined and caused to contract, thus producing a hollow chamber; the contracting surface may be either on the upper or under side of the leaf, but is always constant in the same species. Pupa within the mine, with or without a cocoon.



Neuration and head of *Lithocolletis faginella.*

1. Ground-colour of forewings clear shining white . 2.
,, ,, not clear white . 7.
2. Forewings with two or more angulated fasciae . 3.
,, without two fasciae . . . . 4.
3. Last fascia straight . . . 4. *sylvella.*
,, ,, angulated . . . . 3. *hortella.*
4. Forewings with an oblique fascia from base of costa 1. *roboris.*
,, without such fascia . . . 5.
5. Forewings with fuscous median line from base 7. *heegeriella.*
,, without basal line . . . 6.
6. Forewings with four costal and three dorsal strigulae 6. *tenella.*
,, ,, three costal and two dorsal strigulae 5. *cramerella.*
7. Forewings white, irrorated with fuscous, with dark bars . . . 45. *comparella.*
,, more or less ochreous, with pale markings 8

8. Forewings with two or more entire fasciae . 9.
,, with at most one entire fascia . . 17.
9. Head and base of forewings black 40. *schreberella.*
,, ,, ,, not black . . 10.
10. Forewings with short pale median basal dash . 11.
,, without such dash . . . 14.
11. Forewings with three posterior dorsal spots
41. *emberizipennella.*
,, with not more than two such spots . 12.
12. A white streak from angle of third fascia to costa
42. *tristrigella.*
No such connecting streak . . . 13.
13. Three posterior costal and two dorsal spots 38. *stettinensis.*
Two posterior costal and one dorsal spot 43. *scabiosella.*
14. Forewings pale reddish-ochreous . . 44. *trifasciella.*
,, shining golden-ochreous . . 15.
15. Three costal spots beyond second fascia . . 16.
Two costal spots beyond second fascia 39. *kleemannella.*
16. Fasciae and spots whitish . . 36. *Nicellii.*
,, ,, ochreous-tinged 37. *froelichiella.*
17. Forewings with a pale median basal streak . 18.
,, without basal streak . . 2. *amyotella.*
18. Forewings reddish-ochreous . 35. *corylifoliella.*
,, not reddish-ochreous . . . 19.
19. Face leaden-metallic . . . . 20.
,, not metallic . . . . . 22.
20. Head black on crown . . . 9. *lautella.*
,, fuscous . . . . . 21.
21. Cilia sharply barred above tornus; expanse 5-7 mm.
11. *insignitella.*
,, not sharply barred; expanse 8-9 mm.
10. *nigrescentella.*
22. Basal streak reaching to beyond middle 32. *quercifoliella.*
,, ,, not reaching beyond middle . . 23.
23. Pale markings ill-defined and indistinct . 34. *viminiella.*
,, ,, sharply defined . . . 24.
24. First dorsal streak reaching opposite apex of second
costal . 33. *messaniella.*
,, ,, not reaching apex of second
costal . . . 25.
25. A white costal streak from near base to $\frac{2}{5}$
29. *quinqueguttella.*
No such costal streak . . . . 26.

26. Dorsal spot at ⅓ reaching basal streak 16. *viminetorum.*
,, ,, not reaching basal streak . 27.
27. First pair of spots almost or quite confluent, to form a fascia . . 28.
,, ,, not tending to form a fascia 32.
28. Fascia more or less angulated . . . 29.
,, slightly bent only . . . 14. *spinolella.*
29. Basal streak dark-margined above . . 30.
,, ,, not dark-margined . . . 31.
30. A short white dorsal streak from base . 12. *anderidae.*
A white dorsal spot at ⅓ . 13. *ulmifoliella.*
31. A short white dorsal streak from base . 15. *cavella.*
A white dorsal spot at ⅓ . . 17. *salicicolella.*
32. First costal spot produced along costa towards base 33.
,, ,, not produced . . . 34.
33. First costal spot dark-margined posteriorly 26. *coryli.*
,, ,, not dark-margined posteriorly 25. *carpinicolella.*
34. First costal spot reaching beyond first dorsal 8. *alnifoliella.*
,, ,, not reaching beyond first dorsal 35.
35. Dorsum narrowly white towards base, with whitish spot at ⅓ . . . . 36.
,, not whitish-marked towards base . 42.
36. First pair of spots little oblique . . 18. *lantanella.*
,, ,, ,, strongly oblique . . 37.
37. Posterior tarsi with dark fuscous spots . . 38.
,, ,, without dark fuscous spots . 39.
38. Forewings more orange, first spots posteriorly dark-margined . . . 20. *torminella.*
,, more brown, first spots not posteriorly dark-margined . 19. *pomifoliella.*
39. A whitish dorsal spot at ⅓ . . 24. *faginella.*
Dorsum narrowly white towards base . . 40.
40. Basal streak dark-margined above . . 41.
,, ,, not dark-margined . 22. *cerasicolella.*
41. Dorsal spots dark-margined posteriorly . 21. *sorbi.*
,, ,, not dark-margined posteriorly 23. *spinicolella.*
42. A dark apical hook in cilia . . 27. *distentella.*
No dark hook in cilia . . . . 43.
43. Basal streak dark-margined above . 28. *junoniella.*
,, ,, not dark-margined . . . 44.
44. Forewings with black line in cilia . 30. *ulicicolella.*
,, with only faint line in cilia . 31. *scopariella.*

1. **L. roboris**, *Z.* 7-9 mm. Forewings shining white; a very oblique golden-brown fascia from base of costa, broad above, posteriorly fuscous-edged; four dark fuscous costal strigulae towards apex, anteriorly edged with an ochreous tinge, first oblique and nearly meeting a similar dorsal strigula; a golden-brown apical spot containing a black dot; a dark apical hook in cilia. Hindwings grey.

Britain to Roxburgh, local; C. and SE. Europe; 5, 8. Larva in leaves of oak (underside); 7, 9, 10.

2. **L. amyotella**, *Dup.* 7-9 mm. Forewings golden-ochreous, posteriorly mixed with dark fuscous; a dorsal spot at $\frac{1}{4}$, and opposite oblique costal and dorsal spots at $\frac{1}{2}$ and $\frac{3}{4}$ white, edged with dark fuscous; a dark apical hook in cilia. Hindwings grey.

Gloucester, Worcester, Lancashire to Durham, local; C. Europe; 5, 8. Larva in leaves of oak (underside); 7, 9, 10.

3. **L. hortella**, *F.* 7-9 mm. Forewings shining white; three brownish-ochreous blackish-edged fasciae, second and third acutely angulated, often interrupted below angle, angle of third emitting a streak to apex; two brownish-ochreous posteriorly blackish-edged costal strigulae towards apex, reaching apical streak; a dark apical hook in cilia. Hindwings light grey.

England to Lancashire, local; C. Europe, Asia Minor; 5, 8. Larva in leaves of oak (underside); 7, 9, 10.

4. **L. sylvella**, *Hw.* (*acerifoliella*, *Z.*) 7-9 mm. Forewings shining white; a fascia near base indicated by black margins only; two brown or brown-whitish blackish-edged angulated fasciae before and beyond middle. sometimes connected by a dash in disc, second followed by a straight similar fascia touching its angle; two brown posteriorly black-edged costal spots before apex; a dark fuscous apical strigula, ending in a black spot. Hindwings light grey.

England to York, common; C. Europe, Asia Minor; 5, 8. Larva yellowish; head pale yellow-brown: in leaves of maple (underside); 7, 10.

5. **L. cramerella**, *F.* 7-10 mm. Forewings shining white; three posterior costal and two dorsal dark fuscous strigulae, anteriorly more or less margined suffusedly with brownish-ochreous; apex brownish-ochreous, enclosing a round black apical dot; an ill-defined dark hook in apical cilia. Hindwings light grey.

Britain to the Clyde, Ireland, very abundant; N. and C.

Europe, Asia Minor; 5, 8. Larva in leaves of oak (underside); 7, 9, 10.

6. **L. tenella**, *Z.* 7-8 mm. Forewings shining white; four costal and three dorsal dark fuscous strigulae, anteriorly more or less margined suffusedly with pale yellow-ochreous; apex pale yellow-ochreous, enclosing a black usually elongate apical dot; an ill-defined dark hook in apical cilia. Hindwings grey.

Britain to Roxburgh, local; C. Europe; 5, 8. Larva in leaves of hornbeam (underside); 7, 9, 10.

7. **L. heegeriella**, *Z.* 7-8 mm. Forewings shining white; a fuscous median line from base to middle; four costal and three dorsal dark fuscous strigulae, anteriorly more or less broadly margined with pale yellow-ochreous; apex pale yellow-ochreous, enclosing an elongate black apical dot; an ill-defined dark hook in apical cilia. Hindwings pale grey.

Britain to the Clyde, E. Ireland, local; C. Europe; 5, 8. Larva in leaves of oak (underside); 7, 9, 10.

8. **L. alnifoliella**, *Dup.* (*alniella*, Z.) 7-9 mm. Forewings fuscous or ochreous, in ♀ more whitish towards base; a pointed white median streak from base to middle, edged with dark fuscous above; four costal and three dorsal posterior shining white wedge-shaped spots, edged anteriorly and first costal posteriorly with dark fuscous, first dorsal broad, before first costal; a round black apical dot; an ill-defined dark hook in apical cilia. Hindwings grey.

Britain to Caledonian Canal, N. and E. Ireland, common; N. and C. Europe; 5, 8. Larva greenish-white; dorsal line green; head pale brown: in leaves of alder (underside); 7, 9, 10.

9. **L. lautella**, *Z.* (*irràdiella*, Stt.) 6-8 mm. Head black, face leaden-metallic. Antennae with apex white. Forewings ochreous-orange or golden-brown; a silvery-white black-edged median streak from base to $\frac{2}{5}$, and central sometimes interrupted fascia; two costal and two dorsal posterior triangular silvery-white spots, edged with black anteriorly and dorsal posteriorly; an elongate blackish apical spot. Hindwings dark grey.

Britain to the Clyde, E. Ireland, local; C. Europe; 5, 8. Larva in leaves of oak (underside); 7, 9, 10.

10. **L. nigrescentella**, *Logan* (*bremiella*, Fr.) 8-9 mm. Head fuscous, face leaden-metallic. Forewings golden-ochreous, sometimes more or less suffused with fuscous or dark fuscous; a silvery-white dark-edged median streak from base to $\frac{1}{3}$; a curved fascia before middle, three posterior costal and two dorsal

triangular spots silvery-white, dark-margined; a blackish apical spot. Hindwings rather dark grey.

England, E. Ireland, local; S. Germany, Switzerland; 4, 8. Larva yellowish; dorsal line dark green; head very pale brownish: in leaves of *Vicia sepium* (underside), and occasionally *Trifolium*, *Medicago*, etc.; 7, 9, 10.

11. **L. insignitella**, *Z.* 5-7 mm. Differs from *L. nigrescentella* as follows: forewings more orange-tinged, margins of silvery-white markings blacker, basal streak somewhat longer, first costal and dorsal spots more opposite, cilia more sharply barred with white on second dorsal spot.

Durham, local; Germany; 5, 8. Larva in leaves of *Trifolium* and *Ononis* (underside); 7, 9, 10.

12. **L. anderidae**, *Fletcher.* 5-7 mm. Differs from *L. ulmifoliella* as follows: forewings more orange, basal median streak dark-margined beneath towards apex, sometimes reaching fascia, a very slender white dorsal streak to $\frac{1}{3}$, dark-edged above, dark edging continued along dorsum to join fascia, median fascia partially dark-margined posteriorly, hindwings paler.

Sussex, Dorset, local; not recorded elsewhere; 5, 8. Larva yellowish-green; head black, towards centre light grey: in leaves of birch (underside); 7, 9, 10.

13. **L. ulmifoliella**, *Hb.* 7-8 mm. Head golden-brownish, face white. Antennae with apex white. Forewings golden-brownish; a shining white median streak from base to $\frac{2}{5}$, dark-margined above; an ill-defined white dorsal spot at $\frac{1}{3}$; a somewhat angulated median fascia, three posterior costal and two dorsal triangular spots shining white, anteriorly dark-margined; a black apical dot. Hindwings rather dark grey.

Britain to Caledonian Canal, N. and E. Ireland, common; N. and C. Europe; 5, 8. Larva yellow-green; dorsal line greenish-grey; head pale brown: in leaves of birch (underside); 7, 9, 10.

14. **L. spinolella**, *Dup.* 8-10 mm. Head whitish, mixed with fuscous, face white. Antennae with apex white. Forewings golden-ochreous; a white median streak from base to $\frac{1}{3}$; an ill-defined white dorsal spot at $\frac{1}{4}$; a slightly bent median fascia, three posterior costal and two dorsal spots white, anteriorly dark-margined; a black apical dot; dark line of cilia nearly obsolete. Hindwings grey.

Britain to the Clyde, common; N. and C. Europe; 5, 8. Larva in leaves of *Salix caprea* (underside); 7, 9, 10.

15. **L. cavella**, *Z.* 8-10 mm. Head white, forehead ochreous-tinged. Antennae whitish. Forewings clear golden-ochreous; a white median streak from base to near middle; basal third of dorsum slenderly white; four triangular costal and three longer wedge-shaped dorsal spots shining white, anteriorly more or less dark-margined, first costal and dorsal sometimes confluent to form an angulated fascia; a black apical strigula, surmounted by a white spot. Hindwings light grey.

Kent, Essex, Hereford, local; C. Europe; 5, 8. Larva in leaves of birch (underside); 7, 9, 10.

16. **L. viminetorum**, *Stt.* 7-9 mm. Antennae with apex whitish. Forewings golden-brown, sprinkled with dark fuscous; a slender white median streak from base to near middle; a triangular white dorsal spot at $\frac{1}{3}$ reaching basal streak; an angulated sometimes interrupted median fascia, three ill-defined posterior costal and two dorsal spots white, anteriorly dark-margined; an elongate blackish apical dot. Hindwings dark grey.

Britain to Ross, local; Germany; 5, 8. Larva pale yellowish; dorsal line greenish; head pale brown: in leaves of *Salix viminalis* (underside); 7, 9, 10.

17. **L. salicicolella**, *Sirc.* 7-9 mm. Differs from *L. viminetorum* as follows: forewings more golden-ochreous, dorsal antemedian spot not reaching basal streak, hindwings rather lighter.

England, N. and E. Ireland, common; Germany, Switzerland; 5, 8. Larva whitish-green; dorsal line green; head brown: in leaves of *Salix caprea* (underside); 7, 9, 10.

18. **L. lantanella**, *Schrk.* 8-9 mm. Forewings light golden-ochreous; a white dark-margined median streak from base to near middle; dorsum slenderly white towards base; four costal and three dorsal shining white wedge-shaped spots, anteriorly dark-margined, first costal small, shorter than second; a blackish apical dot, white-edged anteriorly. Hindwings grey.

Britain to Forfar, local; C. Europe; 5, 8. Larva pale yellowish; dorsal line dark green; head pale brown: in leaves of *Viburnum lantana* (underside); 7, 9, 10.

19. **L. pomifoliella**, *Z.* (*oxyacanthae*, Fr.) 7-9 mm. Posterior tarsi with dark fuscous spots. Forewings golden-brown to dark brown; a white median streak from base to near middle, dark-margined above; dorsum narrowly white towards base; four costal and three dorsal white wedge-shaped spots, anteriorly blackish-margined, first costal small, first dorsal long, sometimes interrupted; a blackish apical spot. Hindwings dark grey.

Britain to Caledonian Canal, Ireland, plentiful; N. and C. Europe, N. America; 5, 8. Larva pale yellowish; dorsal line green; head pale brown: in leaves of hawthorn and apple (underside); 7, 9, 10.

20. **L. torminella**, *Fr.* 6-8 mm. Differs from *L. pomifoliella* as follows: forewings brownish-orange, markings more shining white, first costal and dorsal spots posteriorly black-margined.

England to Lancashire, local; C. Europe; 5, 8. Larva whitish; dorsal line dark green; head pale brown: in leaves of *Pyrus torminalis* (underside); 7, 10.

21. **L. sorbi**, *Fr.* 7-9 mm. Posterior tarsi whitish. Forewings light golden-ochreous; a white median streak from base to near middle, dark-margined above; dorsum narrowly white towards base; four costal and three dorsal shining white wedge-shaped spots, dark-margined anteriorly and dorsal posteriorly, first dorsal long; a blackish apical spot. Hindwings grey.

York, Westmoreland, Durham, local; N. and C. Europe; 5, 8. Larva in leaves of *Pyrus aucuparia* and *Prunus padus* (underside); 7, 9, 10.

22. **L. cerasicolella**, *HS.* 7-8 mm. Posterior tarsi whitish. Forewings golden-orange; a white median streak from base to near middle; dorsum narrowly white towards base; four costal and three dorsal shining white anteriorly blackish-margined wedge-shaped spots; a black apical strigula, edged above with white. Hindwings grey.

York, local; C. Europe; 5, 8. Larva pale yellow; head dark brown or black; plate of 2 orange-yellow: in leaves of *Prunus avium* (underside); 7, 9, 10.

23. **L. spinicolella**, *Stt.* 6-8 mm. Posterior tarsi whitish. Forewings golden-ochreous; a white median streak from base to near middle, dark-margined above; dorsum narrowly white towards base; four costal and three dorsal shining white anteriorly dark-margined wedge-shaped spots, first dorsal sometimes connected with basal streak; a blackish elongate apical dot. Hindwings light grey.

Britain to Perth, E. Ireland, common; C. Europe; 5, 8. Larva green-whitish; dorsal line dark green; head pale greenish: in leaves of blackthorn and plum (underside); 7, 9, 10.

24. **L. faginella**, *Z.* (*triguttella*, Stt.) 7-9 mm. Posterior tarsi whitish. Forewings pale golden-ochreous, sometimes fuscous-tinged; a white median streak from base to near middle, sometimes dark-margined above; an indistinct whitish dorsal

spot at $\frac{1}{3}$; four costal and three dorsal shining white anteriorly dark-margined wedge-shaped spots; a black elongate apical dot. Hindwings grey.

Britain to Caledonian Canal, Ireland, abundant; C. Europe, N. America; 5, 8. Larva pale greenish-yellow; dorsal line darker; head pale greenish-yellow: in leaves of beech (underside); 7, 9, 10.

25. **L. carpinicolella**, *Stt.* 7-9 mm. Posterior tarsi with dark fuscous spots. Forewings light golden-ochreous; a white median streak from base to about middle; a whitish dorsal spot at $\frac{1}{3}$; four costal and three dorsal shining white anteriorly dark-margined wedge-shaped spots, first costal finely produced along costa towards base; a black elongate apical dot. Hindwings grey.

SE. England to Berks and Norfolk, local; C. Europe; 5, 8. Larva green-whitish; dorsal line dark green; head pale greenish-brown: in leaves of hornbeam (upperside); 7, 9, 10.

26. **L. coryli**, *Nic.* 7-8 mm. Differs from *L. carpinicolella* as follows: forewings golden-ochreous, often fuscous-tinged, first costal spot dark-margined posteriorly.

Britain to Berwick, E. Ireland, common; C. Europe; 5, 8. Larva pale yellowish; dorsal line dark green; head pale brown: in leaves of hazel (upperside); 7, 9, 10.

27. **L. distentella**, *Z.* 8-9 mm. Head white. Posterior tarsi whitish. Forewings pale shining golden-ochreous; a strong white median streak from base to near middle; four costal and two dorsal large shining white anteriorly dark-edged wedge-shaped spots; a small black apical dot preceded by an indistinct fuscous suffusion; a fuscous projecting apical hook in cilia. Hindwings pale grey.

Hereford, local; C. Europe; 5, 8. Larva in leaves of oak (underside); 7, 9, 10. Pupa without a cocoon.

28. **L. junoniella**, *Z.* (*vacciniella*, Stt.) 7-8 mm. Forewings shining golden-ochreous; a white median streak from base to near middle, dark-margined above; four costal and three dorsal shining white wedge-shaped spots, dark-margined anteriorly and first pair posteriorly, first costal short; a black elongate apical dot. Hindwings grey.

Cheshire to Caledonian Canal, local; N. and C. Europe; 6, 8. Larva in leaves of *Vaccinium vitis-idaea* (underside); 4, 5, 7.

29. **L. quinqueguttella**, *Stt.* 5-7 mm. Forewings golden-ochreous; a white median streak from base to near middle, dark-margined above; a white posteriorly dilated dark-edged

streak along costa from near base to $\frac{2}{5}$; four costal and three dorsal shining white anteriorly dark-margined triangular spots, first dorsal short; a blackish apical dot. Hindwings grey.

England to York, local; Germany; 5, 8. Larva in leaves of *Salix repens* (underside); 7, 9, 10.

30. **L. ulicicolella**, *Stt.* 6-8 mm. Forewings shining golden-ochreous; a white median streak from base to near middle; four short costal and three dorsal shining white wedge-shaped spots, first dorsal long, second broad; a black apical strigula; a black line in cilia. Hindwings grey.

England to Durham, local; not recorded elsewhere; 6, 7. Larva probably on *Ulex*.

31. **L. scopariella**, *Z.* 7-8 mm. Differs from *L. ulicicolella* as follows: forewings duller, basal streak often connected with apex of first dorsal spot, cilia with only a faint line.

England to Lancashire, local; C. Europe; 6, 7. Larva in bark of stems of *Cytisus scoparius*; 5.

32. **L. quercifoliella**, *Z.* 7-9 mm. Forewings shining pale golden-ochreous; a whitish dark-margined median streak from base to beyond middle; four costal and three dorsal shining white wedge-shaped spots, dark-margined anteriorly and first costal posteriorly; a black apical dot; an indistinct dark hook in apical cilia. Hindwings grey.

Britain to the Clyde, Ireland, plentiful; N. and C. Europe, Asia Minor; 5, 8. Larva ochreous-whitish; head brown: in leaves of oak (underside); 7, 9, 10.

33. **L. messaniella**, *Z.* 8-10 mm. Forewings light golden-ochreous; a whitish dark-margined median streak from base almost to middle; four costal and three dorsal shining white wedge-shaped spots, dark-margined anteriorly and first pair except towards origin posteriorly, first dorsal very long, reaching opposite apex of second costal; a black apical dot. Hindwings grey.

Britain to the Clyde, N. and E. Ireland, common; C. and SE. Europe, Asia Minor; 5, 8, 11. Larva yellow, paler anteriorly; dorsal line dark green; head brownish: in leaves of *Quercus ilex* (occasionally also on oak and hornbeam) (underside); 3, 4, 7, 10.

34. **L. viminiella**, *Stt.* 7-9 mm. Forewings shining ochreous, sometimes fuscous-tinged; a median streak from base to near middle, four costal and three dorsal wedge-shaped spots obscure whitish-ochreous, ill-defined and sometimes very indistinct, first dorsal long; a blackish apical strigula. Hindwings grey.

Britain to Caledonian Canal, common; Germany; 5, 8. Larva pale yellowish; dorsal line dark grey; head pale brown: in leaves of *Salix caprea* (underside); 6, 7, 9, 10.

35. **L. corylifoliella**, *Hw.* (*betulae*, Z.; *caledoniella*, Stt.) 8-9 mm. Forewings reddish-ochreous, posteriorly or sometimes almost wholly suffused with blackish-grey blotches; a slender white median streak from base to near middle, with a marked sinuation downwards; a slender oblique white streak from middle of costa, and another from middle of dorsum; sometimes a whitish tornal dot and anteapical strigula. Hindwings grey or dark grey.

Britain to Sutherland, E. Ireland, common; C. Europe; 5, 8. Larva pale yellowish; dorsal line green; head pale brownish: in leaves of hawthorn, apple, birch, etc. (upperside); 7, 9, 10.

36. **L. Nicellii**, *Stt.* (*dunningiella*, Stt.) 7-9 mm. Forewings shining golden-ochreous, sometimes suffused with brown; base pale; a fascia at $\frac{1}{4}$, another in middle, three posterior costal and two dorsal wedge-shaped spots shining whitish, anteriorly blackish-margined, first pair of spots often connected; an oval blackish apical spot. Hindwings grey.

Britain to Caledonian Canal, N. Ireland, common; C. Europe; 5, 8. Larva in leaves of hazel (underside); 7, 9, 10.

37. **L. froelichiella**, *Z.* 9-10 mm. Differs from *L. Nicellii* as follows: forewings somewhat broader, more orange-tinged, markings more ochreous-tinged.

Britain to Caledonian Canal, local; C. Europe; 5, 8. Larva in leaves of alder (underside); 7, 9, 10.

38. **L. stettinensis**, *Nic.* 6-7 mm. Forewings shining golden-orange or brownish-ochreous, sometimes suffused with fuscous; a short shining whitish median streak from base; a fascia at $\frac{1}{4}$, another in middle, three posterior costal and two dorsal wedge-shaped spots shining ochreous-whitish, anteriorly blackish-margined; a round blackish apical spot. Hindwings grey.

Britain to Caledonian Canal, local; C. Europe; 5, 8. Larva pale yellowish-green; dorsal line darker green; head pale brown: in leaves of alder (upperside); 7, 10.

39. **L. kleemannella**, *F.* 7-9 mm. Forewings shining ochreous-orange, sometimes much mixed with dark fuscous; a fascia at $\frac{1}{4}$, another at $\frac{1}{2}$, two posterior costal and two dorsal wedge-shaped spots silvery-whitish, anteriorly blackish-margined; a small round black apical spot. Hindwings rather dark grey.

Britain to Caledonian Canal, local; C. Europe, Asia Minor; 5, 8. Larva in leaves of alder (underside); 7, 9, 10.

40. **L. schreberella**, *F.* 6-8 mm. Head black, face leaden-metallic. Antennae black, apex white. Forewings shining orange; base blackish; a fascia at $\frac{1}{4}$, another at $\frac{1}{2}$, a wedge-shaped costal spot at $\frac{3}{4}$, and a curved streak running from tornus to apex silvery-white, anteriorly blackish-margined, tornal streak more leaden-metallic towards apex. Hindwings grey.

England to York, E. Ireland, rather common; C. Europe, Asia Minor; 5, 8. Larva pale yellowish; dorsal line dark green; head pale brown: in leaves of elm (underside); 7, 9, 10.

41. **L. emberizipennella**, *Bch.* 8-10 mm. Forewings shining golden-ochreous; a short whitish median streak from base; a fascia at $\frac{1}{4}$, another at $\frac{1}{2}$, two posterior costal and three dorsal wedge-shaped spots shining whitish, anteriorly blackish-margined; some blackish scales in disc between spots and towards apex. Hindwings grey.

Britain to Caledonian Canal, rather common; C. Europe, Asia Minor; 5, 8. Larva green-whitish; dorsal line darker green; head pale greenish: in leaves of *Lonicera* (underside); 7, 9, 10.

42. **L. tristrigella**, *Hw.* 7-9 mm. Forewings shining golden-brownish-orange; a short whitish median basal dash; a fascia at $\frac{1}{4}$, another at $\frac{1}{2}$, and a third somewhat angulated and sometimes interrupted at $\frac{3}{4}$ white, anteriorly blackish-margined; a whitish streak from angle of third fascia to costa before apex, edged beneath with black scales. Hindwings grey.

England, rather local; C. Europe; 5, 8. Larva in leaves of elm (underside); 7, 9, 10.

43. **L. scabiosella**, *Dgl.* 6-8 mm. Forewings shining golden-brownish-ochreous; a short white median basal dash; a fascia at $\frac{1}{4}$, another at $\frac{1}{2}$, two posterior costal and one dorsal wedge-shaped spots shining white, anteriorly strongly black-margined, first costal and dorsal spots connected by a patch of black scales extending to tornus; a black apical spot. Hindwings grey.

Surrey, local; Germany, Switzerland; 5, 8, 9. Larva pale yellow; dorsal line greenish; head pale brown: in leaves of *Scabiosa columbaria* (underside); 8, 10-4.

44. **L. trifasciella**, *Hw.* 7-9 mm. Forewings pale reddish-ochreous; three slender whitish more or less angulated fasciae, margined anteriorly with broad blackish suffusions, broadest towards costa, third sometimes interrupted by a patch of blackish scales extending to tornus; a round blackish apical spot preceded by a whitish wedge-shaped costal spot. Hindwings grey.

Britain to the Clyde, E. Ireland, common; C. Europe, Asia Minor, N. America; 5, 8, 11. Larva pale yellow; dorsal line greenish; head pale brownish: in leaves of *Lonicera* (underside); 3, 4, 7, 10.

45. **L. comparella**, *Z.* 7-8 mm. Forewings white, irrorated with fuscous; three thick oblique costal and two shorter alternating dorsal bars fuscous, darker-edged posteriorly; a fuscous costal spot before apex; a black apical strigula. Hindwings grey.

Kent, Surrey, Berks, Hereford, local; C. Europe, WC. Asia to Turkestan; 5, 8. Larva in leaves of *Populus alba*; 7, 9, 10.

8. ORNIX, *Tr.*

Head rough, face smooth. Antennae about 1, in ♂ simple, basal joint without pecten. Labial palpi moderately long, slightly curved, porrected or subascending, second joint smooth-scaled, terminal shorter, pointed. Maxillary palpi moderately long, filiform, porrected. Posterior tibiae smooth-scaled. Forewings: 1b simple, 3 absent, 6 and 7 usually stalked, 7 to costa. Hindwings ⅔, narrow-lanceolate, cilia 2-3; 3 sometimes absent, transverse vein absent between 4 and 5, 5 and 6 sometimes stalked.

A genus of some twenty species, almost restricted to Europe; a development of *Gracilaria*. Imago with forewings elongate-lanceolate. Larva without prolegs on 10, at first mining in leaves, afterwards within a folded (seldom conically rolled) corner of a leaf. The imago sits with the forepart much raised, the anterior and middle legs prominently displayed.

1. Forewings with four costal spots . . 1. *guttea*.
   ,, with numerous costal strigulae . 2.
2. Cilia round apex with tips white . . . 3.
   ,, ,, with tips dark fuscous . . 4.
3. Head and forewings white-mixed . . 3. *betulae*.
   ,, ,, not white-mixed . 2. *loganella*.
4. Markings of forewings ochreous-tinged . 8. *fagivora*.
   ,, ,, not ochreous-tinged . 5.
5. Palpi wholly white . . . . 6.
   ,, with two dark bands . . . . 7.
6. Head ochreous-tinged . . . 5. *torquillella*.
   ,, not ochreous-tinged . . 4. *scoticella*.
7. Forewings with ground-colour grey, blackish spots distinct . 7. *avellanella*.
   ,, ,, ,, dark fuscous, blackish spots suffused 6. *anglicella*.

1. **O. guttea**, *Hw.* 10-12 mm. Head brownish-ochreous. Forewings dark fuscous; four costal and two dorsal subtriangular spots ochreous-white. Hindwings dark fuscous.

England to Durham, rather common; C. Europe; 5, 6. Larva yellowish; dorsal line rather dark green or reddish; head black-brown: within folded leaves of apple; 7, 8.

2. **O. loganella**, *Stt.* 9-11 mm. Head grey mixed with dark brown. Palpi white. Forewings blackish-fuscous; numerous costal strigulae, a spot in disc posteriorly, and two dorsal spots white; a black apical dot; cilia fuscous, terminal half white except on tornus, with a black subapical line. Hindwings dark grey.

Hereford, York to Sutherland, local; not recorded elsewhere; 5. Larva pale green; dorsal line darker; head brown; 2 with four black spots: within folded leaves of birch; 8.

3. **O. betulae**, *Stt.* (*scutulatella*, Stt.) 9-10 mm. Head fuscous, more or less mixed with white. Palpi white, sometimes with dark fuscous subapical ring. Forewings grey, irrorated with dark fuscous and white; numerous costal strigulae, a spot in middle of disc and another posteriorly, and two dorsal spots white; a blackish apical spot; cilia with two dark fuscous lines, tips round apex white, beneath apex with a third dark fuscous line. Hindwings grey.

England, common; N. and C. Europe; 5, 8. Larva whitish-green; dorsal line dark green; head brownish; 2 with four black spots: within folded leaves of birch; 7, 9, 10.

4. **O. scoticella**, *Stt.* 9-10 mm. Head whitish, mixed with fuscous. Palpi white. Forewings dark fuscous, towards base irrorated with white; numerous costal strigulae, a spot in disc posteriorly, and two dorsal spots preceded by blackish spots white; a black apical spot, anteriorly white-margined; cilia with three entire dark fuscous lines. Hindwings grey.

Britain to Sutherland, N. Ireland, local, commoner northwards; Germany, Switzerland; 5, 6. Larva pale yellow-green; dorsal line dark green or red-brown; head pale brown; 2 with four black spots: within folded leaves of *Pyrus aucuparia* and *P. aria*; 8, 9.

5. **O. torquillella**, *Z.* 9-10 mm. Head pale ochreous mixed with fuscous. Palpi white. Forewings rather dark fuscous, purplish-tinged, towards dorsum and costa more blackish; numerous costal streaks, a spot in disc posteriorly, and two or three dorsal spots white; a black apical dot, strongly white-

edged anteriorly; cilia with three entire dark fuscous lines. Hindwings grey.

England to Durham, local; C. Europe, Asia Minor; 5, 8. Larva pale yellow-green; dorsal line dark green or reddish; head pale yellow; 2 with four black spots: within folded leaves of blackthorn; 7, 9.

6. **O. anglicella**, *Stt.* (*fragariae*, Stt.) 9-11 mm. Head ochreous-whitish mixed with fuscous. Palpi white, apex of second joint and median band of terminal dark fuscous. Forewings dark fuscous, irrorated with whitish; numerous costal strigulae, a spot in middle of disc and another posteriorly, and suffused dorsal strigulae interrupted by two blackish spots white; a black apical dot; cilia with three entire dark fuscous lines. Hindwings grey.

England, N. and E. Ireland, very common; C. Europe, N. America; 5, 8. Larva pale greenish-grey; dorsal line darker; spots pale; head pale greenish-brown; 2 with four black spots: within conically folded leaves of hawthorn, and exceptionally on *Fragaria*; 7, 9.

7. **O. avellanella**, *Stt.* (*devoniella*, Stt.) 9-10 mm. Head whitish mixed with fuscous. Palpi white, apex of second joint and median band of terminal dark fuscous. Forewings grey irrorated with dark fuscous and whitish; numerous costal strigulae, an indistinct posterior spot in disc preceded by a blackish elongate spot, and suffused dorsal strigulae interrupted by two elongate blackish spots whitish; a black apical dot; cilia with three entire dark fuscous lines. Hindwings grey.

England, N. Ireland, very common; C. Europe; 5, 8. Larva whitish-green; dorsal line dark green; head brown; 2 with four black spots: within folded leaves of hazel; 7, 9, 10.

8. **O. fagivora**, *Stt.* 9-11 mm. Head ochreous-whitish mixed with fuscous. Palpi white, terminal joint with grey median band. Forewings dark fuscous irrorated with ochreous-whitish; numerous indistinct costal and dorsal streaks and a spot in disc posteriorly ochreous-whitish; cilia with three entire dark fuscous lines. Hindwings grey.

Cambridge, Gloucester, Sutherland, local and uncommon; Germany, Switzerland; 5, (?) 8. Larva whitish-green; dorsal line dark green; head pale brown; 2 with four black spots: within folded leaves of beech; 7, (?) 9.

9. CORISCIUM, *Z.*

Characters of *Gracilaria*, but second joint of labial palpi with rough tuft of scales towards apex beneath; posterior tibiae sometimes bristly above.

A very small but nearly cosmopolitan genus; it agrees in all its habits with *Gracilaria*, of which it is probably an early specialised offshoot.

1. Posterior tibiae bristly above . 3. *brongniardellum*.
,, ,, smooth above . . . 2.
2. Forewings pale yellowish . . 1. *sulphurellum*.
,, not yellowish . . 2. *cuculipennellum*.

1. **C. sulphurellum**, *Hw.* (*citrinellum*, Z.) 12-14 mm. Posterior tibiae smooth above. Forewings pale whitish-yellow, with some scattered minute black dots, variable in development; sometimes spots of grey strigulae, especially in disc; sometimes a ferruginous black-spotted median longitudinal streak from base of costa to apex. Hindwings dark grey.

Britain to Caledonian Canâl, N. Ireland, amongst oaks, local; C. and S. Europe; 9-4.

2. **C. cuculipennellum**, *Hb.* 11-12 mm. Posterior tibiae smooth above. Forewings whitish, with numerous ochreous or brown strigulae finely irrorated with black; an oblique fascia near base hardly reaching costa, a second before middle hardly reaching dorsum, a third beyond middle interrupted in disc, and a costal spot at ¾ ochreous or brownish, finely irrorated with black. Hindwings dark grey.

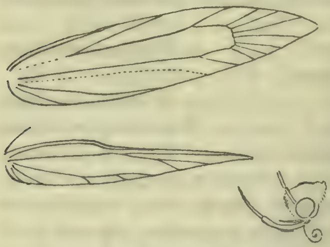
England to Cumberland, N. Ireland, local; C. Europe; 9-4. Larva green-whitish; head and plate of 2 brown: within conically rolled leaves of *Ligustrum;* 7, 8.

3. **C. brongniardellum**, *F.* 8-10 mm. Posterior tibiae bristly above. Forewings fuscous, sprinkled with yellow-whitish; four slender oblique white fasciae, edged with black, more strongly anteriorly, last three interrupted near dorsum; a black projecting hook in apical cilia. Hindwings dark grey.

England to Cumberland, E. Ireland, not uncommon; C. and S. Europe, N. Africa; 7-9. Larva pale whitish-green; dorsal line darker; head pale brown: in blotches in leaves of oak; 6, 7.

10. GRACILARIA, *Hw.*

Head smooth. Antennae 1 or over 1, in ♂ simple, basal joint without pecten. Labial palpi long, curved, ascending, second joint smooth or loosely scaled beneath towards apex, terminal almost as long, pointed. Maxillary palpi moderately long, filiform, porrected. Posterior tibiae smooth-scaled. Forewings: 1b simple, 3 sometimes absent, 7 to costa. Hindwings about $\frac{1}{2}$, linear-lanceolate, cilia 4-5; 3 sometimes absent, transverse vein absent between 4 and 5, 5 and 6 stalked.



Neuration and head of *Gracilaria alchimiella.*

A genus of considerable extent and universal distribution. Its immediate ancestry is obscure, but it is probably an offshoot from a form approaching *Zelleria.* Imago with forewings narrow-elongate, pointed, or elongate-lanceolate. Larva without prolegs on 10, mining blotches or forming rolled conical chambers in leaves. The imago sits with the forepart much raised, the anterior and middle legs prominently displayed.

1. Forewings with several pale marginal spots or fasciae 2.
,, with not more than two pale spots . 8.
2. Forewings with apical white spot . . . 3.
,, without apical white spot . . 5.
3. Forewings with two anterior subdorsal spots 13. *ononidis.*
,, without subdorsal spots . . 4.
4. Crown white except at back . 15. *hofmanniella.*
,, wholly dark fuscous . 14. *imperialella.*
5. Forewings with pale entire fasciae . 9. *syringella.*
,, without entire fasciae . . . 6.
6. Forewings with oblique streaks from costa 12. *omissella.*
,, with spots only . . . 7.
7. Forewings with three costal spots 10. *phasianipennella.*
,, ,, one subcostal and one costal spot 11. *auroguttella.*
8. Forewings with white costal streak 8. *tringipennella.*
,, without white costal streak . . 9.
9. Forewings with white streak from costa before $\frac{1}{3}$ 5. *semifascia.*
,, without such streak . . . 10.
10. Forewings with small black median costal spot 6. *populetorum.*
,, without such spot . . . 11.
11. Costal blotch whitish . . . . 12.
,, ,, yellowish or obsolete . . 13.

12. Apex of costal blotch emitting an oblique streak
2. *stigmatella.*
„ „ „ not emitting a streak
4. *falconipennella.*
13. Costal blotch margined anteriorly by a dark fascia
3. *hemidactylella.*
„ „ without dark fascia . . 14.
14. Costal blotch sharply defined . . 1. *alchimiella.*
„ „ indistinct or obsolete . 7. *elongella.*

1. **G. alchimiella**, *Sc.* (*swederella*, Thnb.) 10-13 mm. Forewings purplish-ferruginous; dorsum suffused with yellow towards base; a large triangular yellow median costal blotch, apex often rounded. Hindwings dark grey.

Britain to Perth, Ireland, common; Europe, N. America; 5, 8. Larva whitish; dorsal line dark greenish-grey; head yellowish, brown-marked: within conically rolled leaves of oak; 7, 9.

2. **G. stigmatella**, *F.* 12-14 mm. Forewings red-brown, darkest towards costal blotch; a triangular white median costal blotch, usually mixed with brown-reddish, on costa marked with several blackish dots, apex emitting a slender outwardly oblique streak towards dorsum. Hindwings grey.

England to Durham, N. Ireland, common; Europe, WC. Asia to Turkestan; 9-5. Larva green-whitish; head yellowish, brown-marked: within conically rolled leaves of *Salix* and poplar; 8, 9.

3. **G. hemidactylella**, *F.* 12-14 mm. Forewings light ochreous-yellowish, mixed and strigulated with red-brown; a large triangular paler median costal blotch, on costa marked with several blackish dots, anteriorly margined by a suffused dark reddish-fuscous fascia. Hindwings grey.

SE. England to Dorset and Norfolk, Cheshire, Westmoreland, S. Ireland, local; C. Europe; 9-5. Larva pale yellow-greenish; dorsal line dark green; head paler: within conically rolled leaves of sycamore; 7, 8.

4. **G. falconipennella**, *Hb.* 12-14 mm. Forewings dark reddish-fuscous irrorated with whitish; margins and fold dotted with black; an indistinct whitish triangular costal blotch before middle. Hindwings dark grey.

Kent, Surrey, Hereford, scarce and local; C. Europe, N. America; 9-4. Larva within folded leaves of alder; 7, 8.

5. **G. semifascia**, *Hw.* 10-12 mm. Forewings reddish-fuscous, often mixed with pale yellowish; an oblique ochreous-white

dark-edged streak from costa before ⅓ to fold, apex bent outwards; some dark fuscous dots on costa. Hindwings dark grey.

England to York, Sutherland (?), local; C. Europe; 9-5. Larva pale greenish; dorsal line dark green; head pale brownish: within conically rolled leaves of maple; 7.

6. **G. populetorum**, *Z.* 11-14 mm. Forewings whitish-ochreous, irregularly tinged and clouded with fuscous; margins dotted with black; a small black spot on middle of costa; blackish dots on fold at ⅓ and ⅔. Hindwings dark grey.

England to Westmoreland, local; C. Europe; 9-4. Larva green-whitish; head very pale brownish: within longitudinally rolled leaves of birch; 7, 8.

7. **G. elongella**, *L.* (*stramineella*, Stt.) 14-16 mm. Forewings deep reddish-ochreous, sometimes mixed or suffused with pale yellowish; margins sometimes with darker dots; often an indistinct pale yellowish triangular costal blotch before middle. Hindwings rather dark grey.

Britain to Sutherland, Ireland, common; Europe, N. America; 6, 9-4. Larva whitish or pale greenish; dorsal line dark grey; head pale brownish or greenish: within conically rolled leaves of alder and birch; 5, 7.

8. **G. tringipennella**, *Z.* 10-13 mm. Forewings pale greyish-ochreous to light ochreous-yellow; an ill-defined white costal streak from base to near apex; subcostal and median longitudinal rows of black dots, and sometimes two or three on fold. Hindwings grey.

Britain to the Shetlands, Ireland, common; C. and SE. Europe, Asia Minor; 5, 8. Larva whitish-green; head black; 2 with two brown marks: in blotches in leaves of *Plantago lanceolata* (upperside); 6, 7, 10-4.

9. **G. syringella**, *F.* 10-13 mm. Forewings light yellow-brownish, towards base with whitish and dark fuscous strigulae; an oblique interrupted fascia about ¼, a somewhat angulated median fascia (sometimes followed by a small costal spot), a tornal spot, a spot on costa beyond, and costal and terminal dots near apex white, black-margined; a blackish discal suffusion beyond middle. Hindwings rather dark grey.

Britain to the Shetlands, Ireland, very common; Europe; 5, 7. Larva whitish, sometimes greenish-tinged; dorsal line darker green; head brownish-tinged: within conically rolled leaves of ash, *Syringa*, and *Ligustrum*; 6, 8, 9.

10. **G. phasianipennella**, *Hb.* (*quadruplella*, Z.) 10-11 mm.

Forewings dark fuscous; three costal spots at $\frac{1}{3}$, $\frac{3}{4}$, and before apex, and two dorsal spots at $\frac{1}{4}$ and $\frac{1}{2}$ ochreous-whitish, more or less dark-margined, often very indistinct. Hindwings rather dark grey.

Britain to Perth, E. Ireland, local; C. Europe, WC. Asia to Turkestan; 9-5. Larva greenish-grey; dorsal line darker; head yellowish, black-spotted; 2 with yellowish plate and four black spots: within conically rolled strips of leaves of *Polygonum hydropiper*, *P. persicaria*, and *Rumex*; 8, 9.

11. **G. auroguttella**, *Stph.* 9-10 mm. Antennae with apex white. Forewings dark fuscous, purplish-tinged; a roundish spot below costa at $\frac{1}{3}$, another on costa at $\frac{2}{3}$, and two on dorsum near base and before tornus bright yellow. Hindwings grey.

England, E. Ireland, common; N. and C. Europe, Asia Minor; 5, 8. Larva whitish-green; dorsal line greener; head pale yellow-brown: within conically rolled leaves of *Hypericum perforatum* and *H. pulchrum*; 6, 9, 10.

12. **G. omissella**, *Stt.* 7-8 mm. Forewings whitish-fuscous, irrorated with dark fuscous; four oblique streaks from costa and two spots on dorsum white, edged with dark fuscous. Hindwings dark grey.

SE. England to Berks and Norfolk, local; Germany; 5, 8. Larva pale whitish-green; dorsal line darker; head yellow-brown: in inflated blotches in leaves of *Artemisia vulgaris* (underside); 7, 9.

13. **G. ononidis**, *Z.* 7-9 mm. Forewings dark brown; four streaks from costa (first three oblique), two anterior subdorsal and two posterior dorsal spots, and an apical spot silvery-white, blackish-margined, first costal and second subdorsal spot sometimes connected. Hindwings dark fuscous.

S. England to Worcester and Cambridge, local; C. Europe; 6-8. Larva yellow-greenish; dorsal line dark green; head ochreous-brownish: in blotches in leaves of *Ononis* and *Trifolium*; 4, 5.

14. **G. imperialella**, *Mn.* 7-8 mm. Head dark fuscous, face silvery-whitish. Forewings dark yellowish-fuscous; base of dorsum, an oblique fascia at $\frac{1}{3}$ not reaching dorsum, three costal streaks or spots, three dorsal spots, and an apical spot shining white, blackish-edged, third costal and dorsal spots sometimes connected. Hindwings dark grey.

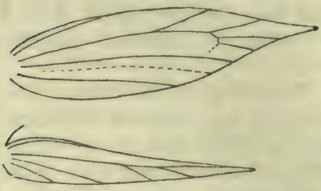
Cambridge, in fens, local; C. Europe; 5, 6. Larva pale greenish; dorsal line darker; head brownish: in blotches in leaves of *Symphytum*; 8, 9.

15. **G. hofmanniella**, *Schleich.* 7-9 mm. Head shining white, back of crown dark fuscous. Forewings brownish-golden; four shining white black-edged rather oblique fasciae, first not reaching dorsum, second and third usually interrupted below middle; a white black-edged apical spot; black lines in apical cilia straight, vertical. Hindwings dark grey.

Dorset, Worcester, local; Germany, Asia Minor; 5, 6. Larva pale orange-yellowish; dorsal line dark green; head paler: in inflated blotches in leaves of *Lathyrus niger* (probably also *L. macrorrhizus*); 7, 8.

[*G. kollariella*, Z., a Central European species with white head, and dark brown forewings with white dorsum, five white streaks from costa, and black projecting hook in apical cilia, has been included in the British fauna on the strength of an old specimen without locality in the British Museum, but further confirmation is needed; the larva mines leaves of *Cytisus* and *Genista*; 6, 9, 10.]

11. LEUCOPTERA, *Hb.*


Neuration of *Leucoptera laburnella*.

Head smooth, or with crown more or less rough posteriorly. Tongue short. Antennae almost 1, in ♂ simple, basal joint dilated with scales and concave beneath to form large eyecap. Labial and maxillary palpi rudimentary. Posterior tibiae hairy. Forewings: 1b simple, transverse vein sometimes absent between 2 and 5, 3 absent, 4 absent, 7 to costa, 8 absent, 9 absent, 10 out of 11 or absent. Hindwings $\frac{1}{2}$, narrow-lanceolate, cilia 4; transverse vein absent between 2 and 5, 3 absent, 4 absent.

A small genus, occurring throughout the Northern hemisphere and in Australia. The species are closely related and very similar. Imago with forewings lanceolate, apex produced. Larva mining blotches in leaves or in bark of twigs. Pupa in a white cocoon outside the mine.

1. Forewings white . . . . . . 2.
„ greyish . . . . . 6.
2. Hindwings whitish . . . . . 3.
„ rather dark grey . . . . 5.

3. Postmedian costal bar nearly touching anteapical spot . . 5. *wailesella.*
,, ,, remote . . . 4.
4. Sides of anteapical spot parallel . . 1. *laburnella.*
,, ,, ,, slightly converging 2. *spartifoliella.*
5. Last two bars in cilia forming an angle of 15° 3. *orobi.*
,, ,, ,, an angle of 30° 4. *lathyrifoliella.*
6. Apex of forewings black . . . 6. *lotella.*
,, ,, orange . . . 7. *scitella.*

Section A. Head wholly smooth ; 10 of forewings absent.

1. **L. laburnella,** *Stt.* 7-9 mm. Forewings white ; an oblique ochreous-yellow bar from costa beyond middle, edged with dark fuscous ; a nearly vertical ochreous-yellow costal spot before apex, edged with dark fuscous parallel lines ; beneath this a pale violet-golden-metallic post-tornal spot, edged on sides with black and above with yellowish ; apex yellowish ; three diverging dark fuscous bars in apical cilia. Hindwings whitish.

England to York, abundant ; C. Europe ; 5, 8. Larva green-whitish : in spiral blotches in leaves of *Cytisus laburnum ;* 6, 7, 9.

2. **L. spartifoliella,** *Hb.* 7-9 mm. Differs from *L. laburnella* as follows : forewings with anteapical spot of costa more oblique, its margins rather converging downwards, metallic post-tornal spot more broadly black-edged, usually preceded by a yellowish mark.

Britain to Ross, Ireland, common ; C. Europe ; 6, 7. Larva greenish : within the bark of stems of *Cytisus scoparius ;* 4, 5.

3. **L. orobi,** *Stt.* 6-7 mm. Differs from *L. lathyrifoliella* as follows : forewings with last two dark bars in apical cilia much less divergent, forming an angle of about 15°.

York, local ; not recorded elsewhere ; 5. Larva in blotches in leaves of *Lathyrus macrorrhizus ;* 8.

4. **L. lathyrifoliella,** *Stt.* 6-7 mm. Differs from *L. laburnella* as follows : forewings with postmedian costal bar longer, touching yellow upper margin of post-tornal spot, dark edgings sharper-marked, apex of wing dark fuscous ; hindwings rather dark grey.

Devon, local ; not recorded elsewhere ; 5. Larva in blotches in leaves of *Lathyrus sylvestris ;* 8.

5. **L. wailesella,** *Stt.* 6-7 mm. Differs from *L. laburnella* as

follows: forewings bluish-tinged, postmedian costal bar longer, nearly touching anteapical spot beneath, apex of wing suffused with dark fuscous.

England, local; France, Germany; 5, 7. Larva pale greenish: in galleries terminating in blotches in leaves of *Genista tinctoria;* 6, 8.

Section B. Crown rough posteriorly; 10 of forewings present.

6. **L. lotella,** *Stt.* 5-6 mm. Forewings light shining metallic grey; apical half beyond an oblique line orange, enclosing two white dark-edged costal spots, and a post-tornal pale golden spot partly black-edged anteriorly and followed by a coppery-black apical spot; a black vertical bar in cilia at apex, a bar before and two diverging bars beyond it, penultimate directed upwards. Hindwings rather dark grey.

Dorset, Suffolk, Norfolk, York, local; not recorded elsewhere; 5, 6. Larva yellow-whitish; head and plate of 2 pale brown: in blotches in leaves of *Lotus corniculatus;* 7, 8.

7. **L. scitella,** *Z.* 7-8 mm. Differs from *L. lotella* as follows: forewings broader, post-tornal spot pale violet-golden, strongly black-margined on both sides, apex of wing orange, penultimate bar in cilia horizontal.

England, local; C. Europe, Asia Minor; 6, 7. Larva green-whitish; head and plate of 2 blackish: in blotches in leaves of hawthorn, apple, and *Pyrus aucuparia;* 8, 9.

12. Lyonetia, *Hb.*

Head rough above, face smooth. Tongue short. Antennae over 1, in ♂ simple, basal joint dilated and concave beneath to form eyecap. Labial palpi short, filiform, drooping, pointed. Maxillary palpi rudimentary. Posterior tibiae shortly hairy. Forewings: 1b furcate, 3 absent, 4 absent, 6 sometimes absent, 7 to costa, 8 absent, 10 absent. Hindwings under $\frac{1}{2}$, linear, cilia 7-9; transverse vein absent between 2 and 5, 3 absent, 4 absent, 6 absent.

A genus of very few species, but occurring throughout the Northern hemisphere and Australia; correlated with the preceding. Imago with forewings very narrowly lanceolate. Larva mining in leaves of trees or shrubs. Pupa in an elongate white cocoon suspended by threads from its ends.

Forewings with dark discal posterior blotch . 2. *clerkella.*
,, without such blotch . 1. *prunifoliella.*

1. **L. prunifoliella**, *Hb.* (*padifoliella*, Hb.) 9-10 mm. Forewings shining white; sometimes a broad fuscous costal suffusion with two darker sinuations beneath; an oblique streak from middle of dorsum, a short tornal streak, and about six streaks from posterior half of costa rather dark fuscous; apex of wing ochreous; a round black apical dot; a projecting blackish hook in apical cilia. Hindwings dark grey.

Northampton (Whittlebury Forest), local; C. Europe, Asia Minor; 9, 10. Larva pale green: in blotches in leaves of blackthorn and birch; 7, 8.

2. **L. clerkella**, *L.* 8-9 mm. Forewings shining white, sometimes partly or wholly suffused with fuscous; a brown or darker fuscous blotch in disc posteriorly; a bent transverse line beyond this, and three costal streaks connected with an apical spot brown or darker fuscous; a round black apical dot; a projecting blackish hook in apical cilia. Hindwings dark grey.

England, Ireland, rather common; N. and C. Europe; 6, 8, 10-4. Larva pale green: in long irregular galleries in leaves of apple, hawthorn, birch, etc.; 5, 7, 9, 10.

13. PHYLLOCNISTIS, *Z.*

Head smooth. Tongue short. Antennae almost 1, in ♂ simple, basal joint rather dilated and concave beneath to form a small eyecap. Labial palpi moderate, filiform, drooping, pointed. Maxillary palpi rudimentary. Posterior tibiae with long bristles above, tarsi with bristly hairs above towards base. Forewings: 1b simple, 3 absent, 4 absent, 6 and 7 stalked, 7 to costa, 8 absent. Hindwings under $\frac{1}{2}$, linear-lanceolate, cilia 5; transverse vein absent between 2 and 5, 3 absent, 4 absent, 5 and 6 stalked.

Though at present very limited in numbers, the genus extends through the Northern hemisphere and Australia; it is correlated with the two preceding; two species only are known in Europe, both of which are fond of frequenting old thatch, from which they may be beaten in abundance. Imago with forewings lanceolate, apex produced. Larva apodal, mining in leaves. Pupa in a cocoon within the mine.

Forewings with two longitudinal lines from base 1. *saligna.*
,, without longitudinal lines . 2. *suffusella.*

1. **P. saligna**, *Z.* 6-7 mm. Forewings shining white, apical area suffusedly whitish-ochreous; two parallel median longitudinal dark fuscous lines from base to middle, enclosed space sometimes ochreous-tinged; a transverse dark fuscous line at $\frac{2}{3}$,

preceded by one and followed by two dark fuscous streaks from costa; a round black apical dot; three dark fuscous diverging bars in apical cilia. Hindwings grey.

S. England to Hereford and Norfolk, very common; C. Europe; 7, 9-4. Larva pale green: in galleries in bark of twigs and ultimately in leaves of *Salix fragilis* and other smooth-leaved species; 6, 8.

2. **P. suffusella**, *Z.* 7-8 mm. Forewings shining white, posteriorly more or less ochreous-tinged; often a suffused spot on dorsum near base and a larger one in middle of disc dark fuscous; a transverse dark fuscous line at $\frac{2}{3}$, preceded by one and followed by two dark fuscous streaks from costa; a round black apical dot; three dark fuscous diverging bars in apical cilia. Hindwings light grey.

S. England to Hereford and Norfolk, very common; C. Europe; 7, 9-4. Larva pale green: in blotches in leaves of poplar; 6, 8.

14. BEDELLIA, *Stt.*

Head rough above, face smooth. Tongue short. Antennae 1, in ♂ simple, basal joint rather stout, with large dense pecten. Labial palpi short, porrected, slender, pointed. Maxillary palpi rudimentary. Posterior tibiae hairy. Forewings: 1b simple, 3-5 absent, 6 and 7 stalked, 7 to costa, 8 absent. Hindwings $\frac{1}{2}$, linear-lanceolate, cilia 6; transverse vein absent between 2 and 5, 3 absent, 4 absent.

The single European species is now nearly cosmopolitan, and its original home uncertain; there is a second species in New Zealand. Imago with forewings narrow-lanceolate; it rests with the forepart slightly raised, the anterior legs retracted. Larva mining blotches in leaves. Pupa exposed, angular, attached by posterior or both extremities.

1. **B. somnulentella**, *Z.* 8-10 mm. Forewings greyish-ochreous, sprinkled with fuscous except along dorsum. Hindwings grey.

England, local; C. and S. Europe, N. America, Australia, New Zealand, probably artificially introduced over part of its range, though by no means confined to the neighbourhood of gardens; 8, 10-5. Larva pale green, purplish-tinged; subdorsal series of purple spots; head pale brown: in blotches in leaves of *Convolvulus* and *Ipomoea*; 7, 8, 9.

15. TISCHERIA, *Z.*

Head rough above, face smooth. Tongue developed. Antennae almost 1, in ♂ with long fine cilia (3), basal joint broad, with a projection of scales. Labial palpi short, filiform, drooping, pointed. Maxillary palpi rudimentary. Posterior tibiae hairy. Forewings: 1b simple, 3 absent, 6 absent, 7 to costa. Hindwings ½, linear-lanceolate, cilia 4; transverse vein absent between 2 and 5, 3 absent, 4 absent, 6 absent.

A small characteristically European genus, apparently correlated with the preceding. Imago with forewings lanceolate; it rests with the forepart somewhat raised, the anterior legs retracted. Larva broad anteriorly, with legs hardly developed, head small, mining blotches in leaves, ejecting all excrement through a hole in the leaf-cuticle. Pupa within the mine, with or without a cocoon.

1. Forewings bronzy-fuscous . . . 2.
    „ yellow . . . . 3.
2. Costa anteriorly purplish . . 5. *angusticollella.*
    „ not purplish . . . 4. *gaunacella.*
3. Forewings with dark fuscous tornal dot . 3. *marginea.*
    „ without such dot . . . 4.
4. Expanse 6-7 mm.; apical area less fuscous 2. *dodonaea.*
    „ 8-11 mm.; apical area more fuscous 1. *complanella.*

1. **T. complanella**, *Hb.* 8-11 mm. Forewings deep ochreous-yellow, suffusedly irrorated with fuscous towards costa posteriorly and apex. Hindwings rather dark grey.

Britain to Ross, Ireland, plentiful; Europe, Asia Minor, N. Africa; 6. Larva pale yellow; head pale brown; 13 brown: in whitish blotches in leaves of oak; 9, 10.

2. **T. dodonaea**, *Heyd.* 6-7 mm. Differs from *T. complanella* only as follows: forewings yellower, less fuscous-tinged towards apex; hindwings dark grey.

England to Lancashire, local; Holland, Germany; 6. Larva yellow; head reddish-brown: in brown blotches in leaves of oak; 9, 10.

3. **T. marginea**, *Hw.* (*emyella*, Dup.) 7-8 mm. Forewings ochreous-yellow; costa anteriorly narrowly, posteriorly broadly suffused with dark purplish-fuscous; termen suffused with dark purplish-fuscous; a dark fuscous tornal dot. Hindwings rather dark grey.

Britain to Caledonian Canal, E. Ireland, common; C. and S. Europe, WC. Asia to N. Persia, N. Africa; 5, 6, 8. Larva greenish; head and two marks on 2 black; 13 greyish: in pale brownish blotches in leaves of bramble (*Rubus*); 7, 9-3.

4. **T. gaunacella**, *Dup.* 6-8 mm. Forewings bronzy-fuscous. Hindwings fuscous.

Essex, local; C. Europe, Asia Minor; 5, 6. Larva in blotches in leaves of blackthorn and *Prunus cerasus;* 9, 10.

5. **T. angusticollella**, *Z.* 8-9 mm. Forewings shining rather dark bronzy-fuscous; costa anteriorly purple-tinged. Hindwings fuscous.

Hereford, Worcester, York, Lancashire, local; C. Europe, Asia Minor, N. Africa; 5, 6. Larva light greenish; head and plate of 2 black; 13 with a black spot: in whitish-brown blotches in leaves of rose; 9, 10.

16. OCNEROSTOMA, *Z.*

Head rough above, face smooth. Tongue obsolete. Antennae $\frac{3}{4}$, in ♂ simple, basal joint moderate, with pecten. Labial palpi very short, drooping, filiform, pointed. Maxillary palpi obsolete. Posterior tibiae smooth-scaled. Forewings: 1b simple, 5 absent, 6 absent, 7 and 8 stalked, 7 to termen, 10 absent. Hindwings under 1, lanceolate, cilia $2\frac{1}{2}$; 4 absent, 6 and 7 parallel.

Only the one species is known. Imago with forewings lanceolate. Larva mining in leaves. Pupa in a cocoon amongst spun leaves of fir.

1. **O. piniariella**, *Z.* 10-11 mm. Forewings shining light grey. Hindwings grey.

England to Westmoreland, E. Ireland, common; C. Europe; 4-8. Larva shining brown; head and plate of 2 black: in leaves of *Pinus sylvestris;* 3-7.

17. CEDESTIS, *Z.*

Head rough above, face smooth. Tongue developed. Antennae $\frac{3}{4}$, in ♂ filiform, simple, basal joint moderate, with pecten. Labial palpi moderate, drooping, somewhat rough beneath, terminal joint longer than second, tolerably pointed. Maxillary palpi obsolete. Posterior tibiae smooth-scaled. Forewings: 1b simple or furcate, 5 sometimes absent, 6 absent, 7 and 8 sometimes stalked, 7 to termen, 10 sometimes absent. Hindwings under 1, lanceolate, cilia $1\frac{1}{2}$-$2\frac{1}{2}$; 4 absent, 6 and 7 parallel.

Includes only the two following species, which differ from one another in some particulars of structure. Imago with forewings lanceolate.

Forewings with golden-brown subbasal fascia 2. *gysseleniella.*
,, without such fascia . . . 1. *farinatella.*

1. **C. farinatella**, *Dup.* 10-11 mm. Forewings brown,

slightly reddish-tinged, towards base and apex whitish-sprinkled; a somewhat curved white fascia before middle, preceded by a darker fascia; indistinct whitish tornal and opposite costal spots; 5 and 10 absent. Hindwings grey.

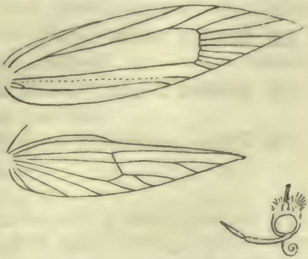
Britain to Aberdeen, common; C. Europe; 6, 7. Larva pale brown, greener dorsally; head and plate of 2 black: in leaves of *Pinus sylvestris;* 3, 4.

2. **C. gysseleniella**, *Dup.* 11-13 mm. Forewings white, irrorated with minute curved dark fuscous marks on scale-tips; a pale golden-brown fascia near base, and another before middle; indistinct tornal and opposite costal white spots; 5 and 10 present. Hindwings pale grey.

Kent, Norfolk, Westmoreland to Perth, local; C. Europe; 6, 7. Larva light brown; head and plate of 2 black: in a loose web amongst leaves of *Pinus sylvestris;* 3, 4.

18. ARGYRESTHIA, *Hb.*

Head rough above, face smooth. Tongue developed. Antennae ¾, in ♂ serrulate, pubescent, basal joint moderate, with pecten. Labial palpi moderately long, somewhat curved, porrected, somewhat rough beneath, terminal joint longer than second, pointed. Maxillary palpi obsolete. Posterior tibiae smooth-scaled. Forewings: 1b furcate or simple, 7 and 8 sometimes stalked, 7 to termen. Hindwings under 1, lanceolate, cilia 2-3; 3 and 4 connate or stalked or separate, 5 and 6 stalked, 7 parallel.



Neuration and head of *Argyresthia nitidella.*

A characteristically European genus of moderate size, extending also into North America. In repose all the species sit with the hinder part obliquely raised from the surface, so that they appear to stand on their head; the purpose of this curious attitude does not seem to be known. Imago with forewings lanceolate. Larva feeding within shoots, leaf-buds, fruits, or bark. Pupa in a dense white cocoon.

1. Forewings unicolorous (and cf. *conjugella*) . 2.
„ not unicolorous . . . 4.
2. Head ochreous-yellowish . . 1. *illuminatella.*
„ white or whitish . . . 3.

3. Head white, forewings bright bronzy . 2. *arceuthina.*
,, ochreous-whitish, forewings light ochreous 3. *praecocella.*

4. Hindwings grey-whitish . . . . 5.
,, grey . . . . . 6.

5. Forewings golden-ochreous with whitish dorsum 11. *aurulentella.*
,, whitish with golden-ochreous markings 12. *abdominalis.*

6. Forewings with whitish interrupted dorsal streak 7.
,, without such streak . . . 15.

7. Forewings partly ferruginous-brown . . 8.
,, without ferruginous colour . . 11.

8. Median fascia reaching costa . . . 9.
,, reduced to dorsal spot . . 10.

9. Fascia reaching costa at $\frac{3}{5}$ . . 19. *ephippella.*
,, ,, ,, at $\frac{4}{5}$ . . 20. *nitidella.*

10. Dorsal spot quadrate . . . 21. *albistria.*
,, triangular . . 22. *semitestacella.*

11. Head yellowish-white . . . . 12.
,, white . . . . . 13.

12. Median fascia entire . . 14. *glaucinella.*
,, ,, interrupted . . 17. *conjugella.*

13. Median fascia reduced to a dorsal spot . . 14.
,, ,, distinct on costa . . 15. *mendica.*

14. Costa posteriorly with two whitish spots . 18. *spiniella.*
,, ,, three or four white strigulae 16. *semifusca.*

15. Ground-colour strigulated with dark fuscous . 16.
,, not strigulated with dark fuscous 17.

16. Forewings with dark median fascia . 10. *cornella.*
,, without median fascia . 13. *retinella.*

17. Ground-colour irrorated with brownish-golden 4. *dilectella.*
,, not irrorated . . . 18.

18. Patagia pale golden . . . . 19.
,, white . . . . . 20.

19. Forewings with three golden fasciae . 7. *goedartella.*
,, with markings not forming fasciae 8. *pygmaeella.*

20. Forewings with transverse fasciae . . 21.
,, without transverse fasciae . 9. *sorbiella.*

21. Costa towards base white . 5. *andereggiella.*
,, ,, coppery-golden . 6. *brockeella.*

Section A. Forewings with 7 and 8 stalked.

1. **A. illuminatella**, *Z.* 9-11 mm. Head ochreous-yellowish. Forewings shining light greyish-ochreous-yellowish. Hindwings light grey.

Norfolk (?), Moray, local, perhaps overlooked; C. Europe; 5, 6. Larva reddish-grey; head and plate of 2 black: in shoots of *Pinus*. The specimens obtained in Norfolk were beaten from larch.

2. **A. arceuthina**, *Z.* 8-9 mm. Head and thorax white, patagia bronzy. Forewings bright shining golden-bronzy. Hindwings pale grey.

Britain to Roxburgh, common; C. and SW. Europe; 5, 6. Larva in shoots of *Juniperus;* 4, 5.

3. **A. praecocella**, *Z.* 9-10 mm. Head ochreous-whitish. Forewings shining light ochreous, faintly rosy-tinged. Hindwings grey.

Norfolk, Cambridge, Westmoreland, amongst *Juniperus*, local; C. and SW. Europe; 5.

4. **A. dilectella**, *Z.* 8-10 mm. Head white. Forewings violet-whitish, suffusedly mixed and irrorated with brownish-golden; a transverse oblique mark from middle of dorsum, a small spot on middle of costa and another beyond it usually darker golden-brown; some small darker spots towards apex. Hindwings pale grey.

England, common; Switzerland, Germany, Finland; 7. Larva in shoots of *Juniperus;* 5.

Section B. Forewings with 7 and 8 separate.

5. **A. andereggiella**, *Dup.* 10-11 mm. Head and thorax white. Forewings shining white; two golden-brown fasciae, first before middle, often obsolete on costa, connected by a bar from middle with apex of second, second oblique, emitting a branch to apex of wing. Hindwings grey.

England, local; C. Europe, N. America (perhaps introduced); 7, 8. Larva in shoots of apple and hazel; 5.

6. **A. brockeella**, *Hb.* 10-12 mm. Head and thorax white. Forewings deep coppery-golden; a spot on base of dorsum, a fascia at $\frac{1}{3}$, three posterior semioval costal spots and a larger tornal spot shining white; sometimes the fascia is connected with adjacent costal and dorsal spots. Hindwings grey.

Britain to Perth, N. and E. Ireland, common; C. Europe; 6, 7. Larva pinkish-brown; head brown; plate of 2 partly blackish-edged: in shoots and catkins of birch and alder; 10-4.

7. **A. goedartella**, *L.* (*literella*, Hw.) 11-12 mm. Head ochreous-whitish, thorax pale golden. Forewings shining yellowish-white, sometimes suffused with pale golden; three shining coppery-golden fasciae, seldom not reaching margins, first near base, oblique, second widely furcate towards costa, third terminal, enclosing two whitish terminal spots. Hindwings rather dark grey.

Britain to Sutherland, N. and E. Ireland, very common; N. and C. Europe, N. America; 6-8. Larva pinkish-ochreous; dots whitish; head brownish; plate of 2 brownish-edged posteriorly: in catkins and shoots of birch and alder; 11-4.

8. **A. pygmaeella**, *Hb.* 12-13 mm. Head and thorax ochreous-whitish, patagia golden. Forewings shining golden-whitish; a dorsal spot at $\frac{1}{3}$ connected with base by a streak along fold, an outwardly oblique streak from middle of dorsum, and a tornal spot shining golden. Hindwings grey.

Britain to the Orkneys, N. Ireland, common; N. and C. Europe, N. America; 6-8. Larva in shoots of *Salix caprea;* 4, 5.

9. **A. sorbiella**, *Tr.* 12-13 mm. Head and thorax whitish. Forewings shining whitish, on costal half strigulated with light golden-brown; a transverse dorsal mark at $\frac{1}{3}$, an outwardly oblique streak from middle of dorsum, and an indistinct tornal mark golden-brown. Hindwings grey.

Dorset, Berks, Gloucester, Cheshire to Perth, local; N. and C. Europe; 6, 7. Larva in shoots of *Pyrus aucuparia;* 5, 6.

10. **A. cornella**, *F.* (*curvella*, Stt.) 11-12 mm. Head and thorax white. Forewings shining white, strigulated with dark fuscous; a small transverse dorsal mark at $\frac{1}{3}$, a narrow fascia from beyond middle of costa to middle of dorsum, and an irregular blotch towards apex dark fuscous. Hindwings grey.

Britain to Argyll, common; C. Europe; 6, 7. Larva in shoots of apple; 5.

11. **A. aurulentella**, *Stt.* 8-9 mm. Head and thorax white, patagia golden. Forewings shining golden-ochreous, with pale purple reflections; dorsum slenderly whitish from base to tornus. Hindwings grey-whitish.

Kent, Surrey, Lancashire, Westmoreland, local; N. and C. Europe; 7, 8. Larva green, posteriorly reddish-tinged; head black: in leaves of *Juniperus;* 4.

[*A. decimella*, Stt., a North European species, is said to have occurred once near London; the specimen may probably have been introduced with plants.]

12. **A. abdominalis**, *Z.* 7-9 mm. Head white. Forewings shining whitish; subcostal and subdorsal longitudinal streaks from base to about middle, and several scattered spots or strigulae on terminal half shining golden-ochreous; some dark fuscous scales at apex. Hindwings grey-whitish.

Surrey, Cambridge, local; N. and C. Europe, Asia Minor, N. America; 7. Larva in shoots of *Juniperus;* 4.

13. **A. retinella**, *Z.* 9-10 mm. Head white. Forewings shining white, irregularly strigulated with dark fuscous; an indistinct fuscous subcostal suffusion anteriorly; a suffused dark fuscous spot in middle of disc, and a larger one towards apex; a black apical dot. Hindwings grey.

Britain to Perth, Ireland, common; C. Europe; 6, 7. Larva in shoots of birch; 5.

14. **A. glaucinella**, *Z.* 8-9 mm. Head yellowish-white. Forewings brassy-fuscous; a whitish dorsal streak, strigulated with dark fuscous; a thick median fascia and apical patch darker fuscous, with bluish reflections, separated by whitish irroration. Hindwings grey.

Britain to Perth, local; Holland, Germany; 6, 7. Larva in bark of oak and horse-chestnut; 3, 4.

15. **A. mendica**, *Hw.* 10-11 mm. Head white. Forewings fuscous, with purple reflections, base ochreous; a thick white dorsal streak to tornus; a darker fuscous median fascia, interrupted in disc, edged with whitish on costa; some whitish costal strigulae posteriorly. Hindwings grey.

England, common; C. and S. Europe, Asia Minor, N. America; 6. Larva whitish-green; head and plate of 2 black: in flowering shoots of blackthorn; 4.

16. **A. semifusca**, *Hw.* 11-12 mm. Head white. Forewings dark purplish-bronzy-fuscous; a thick white dorsal streak to tornus, interrupted by a median spot of ground-colour; costa marked with minute white dashes, posteriorly with three or four white strigulae. Hindwings grey.

England to Cumberland, common; not recorded elsewhere; 8.

17. **A. conjugella**, *Z.* (? *aerariella*, Stt.) 11-12 mm. Head yellowish-white. Forewings rather dark purplish-fuscous; costa strigulated with whitish; a thick white dorsal streak to tornus; an interrupted dark fuscous median fascia; one or two white costal spots before apex. Hindwings grey.

Britain to Caledonian Canal, N. Ireland, common, more local southwards; N. and C. Europe; 6, 7. Larva dull whitish-yellow; head and plate of 2 pale brown: in berries of *Pyrus aucuparia;* 8.

Aerariella, Stt., is an almost unicolorous dark bronzy-fuscous form, locally common (with the type) from Cheshire to York; the larva feeds in the same way; it is probably only a local form, but tending to become distinct.

18. **A. spiniella**, *Z.* 10-13 mm. Head white. Forewings rather dark purplish-fuscous; costa strigulated with white; a thick white dorsal streak to tornus, interrupted by a median spot of ground-colour; two whitish costal spots before apex. Hindwings grey.

Britain to Stirling, E. Ireland, rather local; C. Europe; 8. Larva greenish-grey; dorsal line faintly rosy; head dark brown; 2 with two brown spots: in flowering shoots of *Pyrus aucuparia;* 5, 6.

19. **A. ephippella**, *F.* 10-12 mm. Head white. Forewings ferruginous-brown, towards costa anteriorly suffused with light ochreous-yellowish, costa strigulated with dark brown; a thick whitish dorsal streak to tornus; a dark ferruginous-brown fascia from $\frac{3}{5}$ of costa to middle of dorsum; three whitish costal strigulae beyond it. Hindwings grey.

England to Cumberland, N. Ireland, common; C. Europe, Asia Minor; 7. Larva whitish; head and plate of 2 pale brown: in shoots of *Prunus cerasus;* 4, 5.

20. **A. nitidella**, *F.* (*purpurascentella*, Stt.) 10-11 mm. Head white. Forewings shining ochreous-whitish, usually strigulated and sometimes discally suffused with ferruginous-brown; a suffused ferruginous-brown median longitudinal streak from base to before middle; a curved dark ferruginous-brown fascia from middle of dorsum to $\frac{4}{5}$ of costa, sometimes obsolete except on dorsum. Hindwings grey.

Britain to Perth, Ireland, very common; C. Europe; 7. Larva yellow-green; head and plate of 2 brown: in shoots of hawthorn; 5.

21. **A. albistria**, *Hw.* 9-10 mm. Head white. Forewings ferruginous-brown, purplish-tinged; a white dorsal streak to tornus, interrupted by a dark ferruginous-brown quadrate median spot. Hindwings grey.

England, N. Ireland, very common; C. Europe; 7. Larva pale green; a red band on each segment; head and plate of 2 black: in shoots of blackthorn; 5.

22. **A. semitestacella**, *Curt.* 12-13 mm. Head yellowish-white. Forewings light ferruginous-brown, faintly purplish-tinged; a thick whitish dorsal streak to tornus, interrupted by a dark ferruginous-brown triangular median spot. Hindwings grey.

Britain to the Clyde, common; C. Europe; 8, 9. Larva in shoots of beech; 5, 6.

19. ZELLERIA, *Stt.*

Head rough, tufted between antennae, face smooth. Tongue developed. Antennae $\frac{3}{4}$-$\frac{4}{5}$, in ♂ simple, basal joint moderate, with pecten. Labial palpi moderately long, somewhat curved, drooping, somewhat loosely scaled beneath, terminal joint usually longer than second, sometimes more rough-scaled, tolerably pointed. Maxillary palpi obsolete. Posterior tibiae smooth-scaled. Forewings: 1b simple or furcate, 4 and 5 sometimes stalked, 7 to termen. Hindwings $\frac{4}{5}$-1, lanceolate, cilia $1\frac{1}{2}$-$2\frac{1}{2}$; 4 absent, 5 and 6 rather approximated.

A small but nearly cosmopolitan genus, correlated with the preceding; more species are at present known from Australia than from any other region. The attitude of the imago in repose resembles that of *Argyresthia*, but is less pronounced. Imago with forewings elongate, narrow, pointed. Larva slender, active, in a web amongst leaves. Pupa in a dense white cocoon.

1. Forewings reddish-brown . . 1. *hepariella*.
,, more or less whitish . . . 2.
2. Forewings with distinct dark costal antemedian spot 2. *fasciapennella*.
,, without such spot . . 3. *saxifragae*.

1. **Z. hepariella**, *Stt.* (*insignipennella*, Stt.; *fusca*, Stt.) 10-13 mm. Head varying from reddish-brown to ochreous-whitish. Forewings red-brown, sometimes suffusedly irrorated with dark fuscous, towards dorsum sometimes obscurely paler; second discal stigma sometimes obscurely dark fuscous. Hindwings dark grey, lighter anteriorly.

Britain to Perth, local and not common; C. and SE. Europe; 8-4. Larva light green; dorsal line dark green; head yellowish-brown: in shoots or amongst spun leaf-tips of ash; 6.

2. **Z. fasciapennella**, *Stt.* 15-18 mm. Head light fuscous, mixed with whitish. Forewings light grey, irrorated with whitish; four longitudinal series of black dots, uppermost only

on anterior half; a dark fuscous costal spot before middle, meeting a curved oblique fuscous streak extending from $\frac{1}{3}$ of dorsum to middle of disc, thence indistinctly continued to apex, often interrupted; an indistinct dark costal anteapical spot, edged with whitish suffusion; a black subbasal line in cilia only distinct round apex. Hindwings grey, paler anteriorly.

Edinburgh (Pentland Hills), local; Finland, Bavarian Alps; 9, 10.

3. **Z. saxifragae**, *Stt.* 12-15 mm. Head white, sometimes mixed with light fuscous. Forewings white, sprinkled with pale brownish; four longitudinal series of black dots, uppermost only on anterior half; a curved oblique dark brown streak extending from $\frac{1}{3}$ of dorsum to middle of disc; an indistinct often interrupted longitudinal brownish suffusion from extremity of this to apex of wing; a black subbasal line in cilia round apex, reaching tornus. Hindwings grey, paler anteriorly.

Perth, local; Swiss Alps; 6, 7. Larva greenish; dorsal line reddish; subdorsal dark reddish, interrupted; head yellow-brown: in hearts of *Saxifraga aizoides;* 5, 6.

20. SWAMMERDAMIA, *Hb.*

Head rough. Tongue short. Antennae $\frac{3}{4}$, in ♂ minutely ciliated, basal joint moderate, without pecten. Labial palpi moderate, porrected, second joint somewhat rough-scaled beneath, terminal as long as second, pointed. Maxillary palpi rudimentary. Posterior tibiae smooth-scaled. Forewings: 1b simple or furcate, 6 absent, 7 to termen. Hindwings 1, elongate-ovate or ovate-lanceolate, with transparent subbasal patch, cilia 1-$1\frac{1}{2}$; 4 absent, 6 and 7 parallel.

A small genus confined to Europe. The position assumed in repose by the imago is that of *Zelleria*, and in this instance there can be little doubt that it assists (in conjunction with the colouring) in producing a protective resemblance to the droppings of birds. Imago with forewings elongate. Larva certainly often very variable and assuming different forms locally, beneath a slight web on upper surface of leaves. Pupa in dense white cocoon.

1. Forewings with golden-ochreous apical spot . . . 1. *combinella.*
,, without such spot . . . . . 2.
2. Fascia forming two spots . . . . 4. *caesiella.*
,, not forming two spots . . . . 3.

3. Cilia of forewings distinctly coppery-tinged 5. *pyrella.*
„ „ not coppery . . . 4.
4. Fascia reaching costa; thorax fuscous . 3. *lutarea.*
„ not reaching costa; thorax whitish 2. *heroldella.*

1. **S. combinella,** *Hb.* (*comptella,* Hb.; *apicella,* Don.) 15-16 mm. Head white, sometimes fuscous-mixed. Forewings light greyish-ochreous more or less irrorated with white; base of dorsum fuscous; several longitudinal series of dark fuscous marks; a roundish golden-ochreous apical spot, partly edged anteriorly with dark fuscous; apical cilia fuscous, with two black lines.

Britain to Roxburgh, Ireland (except N.), common; C. Europe, Asia Minor; 5, 6. Larva dull green; dorsal line darker; subdorsal series of dull red dots; head yellowish-brown: several together in a common web on blackthorn; 7-9.

2. **S. heroldella,** *Hb.* (*griseocapitella,* Stt.; *nanivora,* Stt.) 11-12 mm. Head white, sometimes suffused with fuscous. Thorax white, usually sprinkled or suffused with fuscous. Forewings white, closely irrorated with fuscous, dorsum usually paler; some longitudinal series of indistinct dark fuscous dots; a dark fuscous fascia before middle, not reaching costa; a white costal spot towards apex; cilia darker, with two dark fuscous lines. Hindwings grey.

Britain to the Orkneys, N. Ireland, local; N. and C. Europe; 5, 6, 8. Larva pale green; dorsal and subdorsal darker; head yellow-brown; 2 grey-speckled: on birch; 7, 9. The larva appears to have also a brown form, and sometimes a black head.

3. **S. lutarea,** *Hw.* (*oxyacanthella,* Dup.) 11-13 mm. Head white, sometimes ochreous-tinged. Thorax fuscous, sometimes whitish-sprinkled. Forewings fuscous-whitish, closely irrorated with dark fuscous; some longitudinal series of indistinct dark fuscous dots; a dark fuscous entire fascia before middle; a white costal spot before apex; cilia fuscous, with two darker lines. Hindwings fuscous.

England, common; C. Europe; 7. Larva deep brown; subdorsal line white, orange-spotted; spiracular white, on 5-12 orange-spotted above; head ochreous-brown, blackish-marked: when young several together in a common web, afterwards singly on hawthorn and *Pyrus aucuparia;* 9-5. The larva hibernates in a cocoon when half-grown; it is sometimes partly greenish, or is without the subdorsal lines.

4. **S. caesiella,** *Hb.* (*spiniella,* Hb.) 10-12 mm. Head white.

Thorax white, sometimes anteriorly fuscous-sprinkled. Forewings white, irregularly irrorated with fuscous; some longitudinal series of blackish dots; antemedian dark fuscous fascia reduced to two spots, discal and dorsal; two white spots on costa posteriorly, separated by a dark fuscous spot; cilia coppery-tinged, with two dark purplish-fuscous lines. Hindwings pale fuscous.

Britain to Sutherland, Ireland, very common; C. Europe; 7, 8. Larva reddish-brown; dorsal line broad, paler, becoming indistinct posteriorly; spiracular broad, yellowish-white; head pale yellow-ochreous: often two or three together in a common web, on blackthorn; 6.

5. **S. pyrella**, *Vill.* 10-11 mm. Head white or whitish-ochreous. Thorax dark fuscous, whitish-sprinkled. Forewings fuscous, faintly purplish-tinged, closely irrorated with dark fuscous, and irregularly sprinkled with whitish; a dark purplish-fuscous entire fascia before middle; a whitish anteapical costal spot; cilia dark coppery-fuscous. Hindwings grey; in ♂ anterior half, in ♀ base whitish.

Britain to the Clyde, E. Ireland, common; C. Europe; 5, 8. Larva pale yellow; subdorsal line dark red-brown; 4-12 with pale brown anterior bands; head brown, sides blackish: on hawthorn, apple, and cherry; 7, 9.

21. Roeslerstammia, *Z.*

Head rough above, face smooth. Tongue developed. Antennae $\frac{4}{5}$-1, in ♂ ciliated, basal joint moderate, without pecten. Labial palpi moderate, curved, porrected, second joint somewhat rough beneath, terminal joint longer than second, pointed. Maxillary palpi obsolete. Posterior tibiae hairy. Forewings: 1b furcate, 7 and 8 stalked, 7 to costa. Hindwings 1, elongate-ovate, cilia $\frac{1}{2}$; 3 and 4 connate or short-stalked, 5-7 parallel.

Only the two following species are known. Imago with forewings elongate, moderate. Larva when young mining in leaves, afterwards feeding externally.

Hindwings partly yellow . . 1. *pronubella.*
,, wholly dark fuscous . . 2. *erxlebella.*

1. **R. pronubella**, *Schiff.* 11-13 mm. Head ochreous-yellow, centre of crown brownish. Antennae 1, with whitish subapical band. Forewings shining light golden-bronze. Hindwings light ochreous-yellow; dorsum and termen usually very narrowly, apex more broadly suffused with dark fuscous.

Devonshire, Sutherland, local and very rare; C. Europe; 5, 6.

2. **R. erxlebella**, *F.* 13-14 mm. Head orange. Antennae $\frac{4}{5}$, with whitish subapical band. Forewings bright shining golden-bronze. Hindwings dark fuscous.

Britain to Sutherland, local; C. Europe; 5, 6, 8, 9. Larva on *Tilia;* 7, 9, 10.

22. Acrolepia, *Curt.*

Head rough above, face smooth. Tongue developed. Antennae $\frac{3}{4}$, in ♂ simple, basal joint moderate, without pecten. Labial palpi rather long, curved, ascending, second joint somewhat rough beneath, terminal joint longer than second, pointed. Maxillary palpi short, filiform. Posterior tibiae smooth-scaled. Forewings: 1b furcate, 7 to termen. Hindwings 1, elongate-ovate or ovate-lanceolate, cilia 1; 3 and 4 connate or stalked, 5 and 6 stalked, 7 parallel.

A small European genus, which seems to be most at home on the shores of the Mediterranean. Imago with forewings elongate, rather narrow. Larva mining blotches in leaves.

1. Forewings marked with ferruginous-orange 4. *perlepidella.*
   „ not orange-marked . . . 2.
2. Forewings with black sinuate streak towards apex 3. *pygmaeana.*
   „ without such streak . . . 3.
3. Forewings with dark fuscous dorsal spot at $\frac{1}{3}$ 1. *granitella.*
   „ without such spot . . 2. *betulella.*

1. **A. granitella**, *Tr.* 12-14 mm. Forewings more elongate, grey or fuscous, becoming ochreous-brown towards dorsum, more or less strigulated with blackish; several darker spots on costa posteriorly; a dark fuscous dorsal spot at $\frac{1}{3}$, preceded and followed by whitish spots; one or two whitish dorsal dots towards tornus. Hindwings grey.

England to Durham, E. Ireland, local; C. and S. Europe, N. Africa; 8. Larva pale yellow-green; dorsal line darker: in leaves of *Inula dysenterica;* 6, 7. Pupa in an open network cocoon.

2. **A. betulella**, *Curt.* 11-13 mm. Forewings more elongate, fuscous; three irregular costal spots, a suffused streak along dorsum, and a tornal spot dark fuscous, sometimes wholly absorbed in a general dark fuscous suffusion; a small white or whitish dorsal spot before middle, usually marked with one or two dark strigulae; a small black spot before apex, sometimes indistinct. Hindwings grey, darker towards apex.

York, Durham, local; not recorded elsewhere; 8-10.

(The name *marcidella*, Curt., has been applied to two or three specimens of this genus in bad or doubtful condition, supposed to constitute a distinct species, but no proper description appears to have been published, nor is there sufficient material on which to found one.)

3. **A. pygmaeana**, *Hw.* (*autumnitella*, Curt.) 10-11 mm. Forewings less elongate, ochreous-brown to dark fuscous, irregularly strigulated with black and whitish; two blackish costal spots near middle; a triangular dorsal spot of whitish strigulae before middle; a black sinuate streak in disc towards apex; a whitish bar in middle of terminal cilia. Hindwings dark grey, lighter anteriorly.

England to Durham, local; Holland, Germany; 8-4. Larva whitish-green; head brownish: in leaves of *Solanum dulcamara;* 7-10. Pupa in an open network cocoon.

4. **A. perlepidella**, *Stt.* 10-11 mm. Forewings less elongate, dark purplish-fuscous, with four broad irregular partially incomplete ferruginous-orange fasciae; three ochreous-whitish costal spots alternating with these, third double; two light yellowish dorsal spots before and beyond middle, former sometimes meeting first costal spot. Hindwings dark fuscous.

Kent, Gloucester, local; Germany, Switzerland; 6. Larva pale yellowish or greenish; dorsal line darker green; head pale brown: in leaves of *Inula conyza;* 4, 5. Pupa in a dense cocoon within the mine.

23. EPICHNOPTERYX, *Hb.*

Head rough. Tongue obsolete. Antennae in ♂ ½, bipectinated to apex. Labial palpi short, porrected, densely hairy. Maxillary palpi rudimentary. Posterior tibiae loosely scaled. Forewings with hair-scales; 1b furcate, 6 sometimes absent, 7 to apex, 8 absent, 10 sometimes absent. Hindwings under 1, ovate, cilia ¼; 4 absent. ♀ apterous, without legs or antennae.

Restricted to a few species, principally inhabiting C. and S. Europe. Imago with wings clothed with hairs, forewings rather elongate-triangular, costa moderately arched, apex rounded. Larva in a portable case.

Wings unicolorous . . . . 2. *pulla.*
,, with darker markings . . 1. *reticella.*

1. **E. reticella**, *Newm.* 9-10 mm. Forewings and hindwings semihyaline, whitish; scattered transverse spots of thinly strewn dark fuscous hair-scales, tending to form irregular transverse lines; 6 and 10 of forewings absent.

Kent to Hants and Essex, in salt-marshes, local; Holland; 6. Larva pinkish-white; head black; 2-4 with dark brown plates: case covered with fragments of grass and *Conferva;* on grass (?); 9-4.

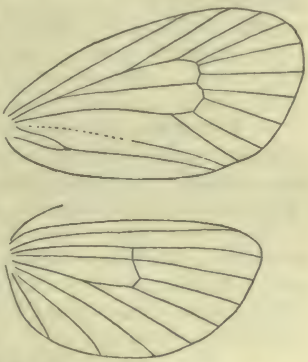
2. **E. pulla,** *Esp.* (*radiella,* Curt.) 11-14 mm. Forewings and hindwings rather thinly clothed with dark fuscous hair-scales; 6 and usually 10 of forewings present.

Kent to Hants and Essex, local; C. and S. Europe, Asia Minor; 5, 6. Larva whitish, purplish-tinged; head black; 2-4 blackish-marked: case covered with longitudinally placed fragments of grass; on grass; 7-4.

24. FUMEA, *Hb.*

Head rough. Tongue obsolete. Antennae in ♂ $\frac{1}{2}$, bipectinated to apex. Labial palpi short, porrected, densely hairy. Maxillary palpi rudimentary. Posterior tibiae smooth-scaled above. Forewings scaled; 1b furcate, 7 to apex, 7 and 8 sometimes short-stalked, 9 absent. Hindwings under 1, ovate, cilia $\frac{1}{4}$; 4 absent. ♀ apterous.

A small European genus, of which the species, from their obscurity and similarity, are still imperfectly understood. Imago with forewings elongate or rather broad, costa moderately arched, termen oblique. Larva in a portable case covered with refuse.



Neuration of *Fumea intermediella.*

1. Forewings with apex obtuse or rounded . . 2.
   ,, ,, distinctly pointed . . 3.
2. Forewings purplish-tinged, apex obtuse . 1. *crassiorella.*
   ,, bronzy-tinged, apex rounded 2. *intermediella.*
3. Forewings uniformly dark . . 3. *betulina.*
   ,, paler-mixed . . . 4. *sepium.*

1. **F. crassiorella,** *Brd.* ♂ 14-15 mm. Forewings rather broad, apex tolerably obtuse; dark fuscous, purplish-tinged. Hindwings rather dark fuscous. ♀ with anal tuft grey-whitish, brownish-mixed.

Surrey, Middlesex, local; SC. Europe; 7. Larva light purplish-brown; subdorsal and spiracular lines on 2-4 reddish;

head light brown, blackish-marked: case covered with longitudinally placed fragments of grass; on grass, etc.; 5. The ♀ of this and the two following species rests with the body strongly bent under, so that the ovipositor is directed forwards.

2. **F. intermediella**, *Brd.* (*roboricolella*, Brd.; *nitidella*, Hof.) ♂ 12-14 mm. Forewings rather broad, apex rounded; dark fuscous, bronzy-tinged. Hindwings dark fuscous. ♀ with anal tuft whitish or grey-whitish, sometimes fuscous-mixed.

Britain to the Clyde, Ireland, common; Europe; 7. Larva dark purplish-brown; head and plates of 2-4 blackish: case covered usually with longitudinally placed fragments of grass; on grass, lichens, etc.; 5.

3. **F. betulina**, *Z.* (*anicanella*, Brd.; ? *salicolella*, Brd.) ♂ 12-14 mm. Forewings rather elongate, apex distinctly pointed; dark fuscous, bronzy-tinged. Hindwings dark fuscous. ♀ with anal tuft white.

SE. England to Hants and Essex, local; C. Europe; 7. Larva purplish-brown; head, plate of 2, and slender plates of 3 and 4 black: case somewhat pointed, covered with fragments of lichen, bark, etc. (not grass); on lichens growing on bushes; 5.

4. **F. sepium**, *Spr.* (*tabulella*, Brd.) ♂ 13-15 mm. Forewings elongate, apex distinctly pointed; rather dark fuscous, more or less mottled with lighter greyish-ochreous. Hindwings fuscous. ♀ with anal tuft brownish.

Worcester, other records doubtful; C. Europe; 7. Larva brownish; head and plate of 2 black: case rather thick, nearly perpendicular, covered with fragments of moss and lichen; on lichens growing on trees; 5. The ♀ rests with the ovipositor directed backwards.

25. SOLENOBIA, *Z.*

Head rough. Tongue obsolete. Antennae $\frac{1}{2}$, in ♂ ciliated, basal joint without pecten. Labial palpi short, drooping, hairy. Maxillary palpi obsolete. Posterior tibiae hairy. Forewings: 1b furcate, 7 and 8 or 8 and 9 sometimes short-stalked, 7 to apex, 10 absent. Hindwings 1, elongate-ovate, cilia $\frac{1}{2}$-1; 4 and 5, or 6 and 7 sometimes short-stalked. ♀ apterous.

A small genus, apparently confined to Europe; the species are largely parthenogenetic, that is, fertile eggs may be laid by unimpregnated females for several generations in succession; the number of females produced is also commonly very much in excess of the males. Imago (male) with forewings elongate, apex rounded. Larva feeding in a portable case on lichens.

Forewings with darker terminal spots 1. *inconspicuella.*
,, without darker terminal spots 2. *Douglasii.*

1. **S. inconspicuella,** *Stt.* 11-13 mm. Forewings pale grey, with numerous irregular undefined spots and strigulae of darker grey scales, sometimes connected to form reticulation; a terminal series of undefined darker spots. Hindwings light grey. ♀ brown, head dark fuscous, anal tuft white.

England, local; Germany; 4, 5. Larva yellowish-grey; head blackish; plate of 2 and pairs of spots on 3 and 4 black: in a greyish-green somewhat three-sided case, on lichens growing on fences and tree-trunks; 6-3.

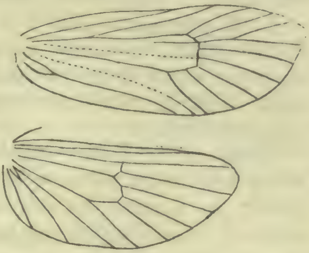
2. **S. Douglasii,** *Stt.* (*triquetrella,* Dbld., non Tr.; *Wockii,* Hein.) 13-17 mm. Forewings fuscous-whitish, strigulated throughout with rather dark fuscous. Hindwings light grey. ♀ brown, head dark fuscous, anal tuft white.

Dorset, Kent, Worcester to Westmoreland, E. Ireland, local; C. Europe; 4. Larva pale yellowish; head and plate of 2 dark brown: in a greyish-green somewhat three-sided case, on lichens growing on fences, rocks, etc.; 6-3.

26. TALEPORIA, *Hb.*

Head rough. Tongue obsolete or rudimentary. Antennae $\frac{2}{3}$, in ♂ ciliated, basal joint without pecten. Labial palpi moderate, porrected, loosely haired, terminal joint somewhat pointed. Maxillary palpi obsolete. Posterior tibiae loosely haired. Forewings: 1b furcate, 7 and 8 stalked, 7 to termen. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$; all veins separate. ♀ apterous.

Restricted to a few European species. Imago with forewings elongate, moderate, apex rounded. Larva feeding in a portable case on lichens.



Neuration of *Taleporia pseudobombycella.*

Head light fuscous . . . 1. *conspurcatella.*
,, pale greyish-ochreous . 2. *pseudobombycella.*

1. **T. conspurcatella,** *Z.* 10-13 mm. Head light fuscous. Antennal ciliations 3. Forewings whitish-yellowish, with numerous small fuscous spots and strigulae; veins fuscous; indistinct darker dorsal spots towards base and before middle; a darker fuscous discal spot beyond middle. Hindwings light grey.

Hants (Southampton), local; Belgium, Italy; 3. Larva on lichens on tree-trunks; 5-9.

2. **T. pseudobombycella**, *Hb.* 15-18 mm. Head pale greyish-ochreous. Antennal ciliations almost 2. Forewings fuscous, with numerous indistinct pale spots between veins, appearing reticulated; usually indistinct whitish-ochreous dorsal spots before and beyond middle; an indistinct darker discal spot beyond middle. Hindwings grey. ♀ brown, anal tuft whitish-grey.

England, common; C. Europe, Asia Minor; 6. Larva whitish; head and plate of 2 black: in a long cylindrical case on lichens on fences and tree-trunks; 9-4.

27. NARYCIA, *Stph.*

Head rough. Tongue obsolete. Antennae ½, in ♂ ciliated with fascicles, basal joint with pecten. Labial palpi moderate, porrected, loosely scaled, pointed. Maxillary palpi obsolete. Posterior tibiae hairy. Forewings: 1b furcate, 7 absent, 8 and 9 sometimes short-stalked. Hindwings 1, elongate-ovate, cilia 1; veins all separate.

Only two European species are known, but the genus is very numerously represented in Australia, some species attaining a considerable size. Imago with forewings elongate, moderate, apex tolerably pointed. Larva feeding in a portable case on lichens.

1. **N. melanella**, *Hw.* 9-11 mm. Head blackish. Forewings dark fuscous, with some scattered whitish dots; an ill-defined irregular fascia of partly confluent whitish dots before middle; small whitish costal and dorsal spots before middle. Hindwings dark grey.

England to York, common; C. Europe; 6. Larva dull yellowish; head, plate of 2, and four spots each on 3 and 4 black: in a short cylindrical greyish-green case on lichens growing on fences and tree-trunks; 4, 5.

28. DIPLODOMA, *Z.*

Head rough. Tongue obsolete. Antennae ½, in ♂ ciliated, basal joint without pecten. Labial palpi moderate, drooping, loosely scaled, tolerably pointed. Maxillary palpi obsolete Posterior tibiae smooth-scaled. Forewings: 1b furcate, 7 to termen. Hindwings 1, elongate-ovate, cilia ¾; 6 and 7 sometimes short-stalked.

Contains only two European species. Imago with forewings elongate, moderate, apex obtuse. Larva feeding in a portable case on dry refuse.

1. **D. marginepunctella**, *Stph.* 11-13 mm. Head light yellowish-ochreous. Forewings dark fuscous, with some scattered whitish-yellowish dots and strigulae; a subquadrate whitish-yellowish dorsal spot before middle. Hindwings dark grey.

Kent, Stafford to Cumberland, E. Ireland, local; C. Europe, Asia Minor; 6, 7. Larva dull whitish; head pale brown; plate of 2 darker brown; 3 and 4 laterally brownish-tinged: in a three-sided case, enclosed in an outer shorter case, covered with fragments of refuse, on dead insects, fungus, etc.; 9-5.

29. TEICHOBIA, *HS.*

Head with appressed scales, side-tufts spreading. Tongue obsolete. Antennae ½, in ♂ pubescent, basal joint without pecten. Labial palpi moderate, curved, porrected, second joint loosely scaled, terminal shorter than second, acute. Maxillary palpi short, drooping, two-jointed. Posterior tibiae smooth-scaled. Forewings: 1b simple, all veins separate, 7 to costa. Hindwings 1, elongate-ovate, cilia 1; all veins separate.

The single known species departs somewhat from the usual type of its allies, but cannot be removed from them; correlated with the preceding. Imago with forewings elongate, moderate, apex tolerably pointed. Larva feeding amongst the fructification of ferns.

1. **T. verhuellella**, *Stt.* 9-10 mm. Forewings dark purplish-fuscous. Hindwings rather dark bronzy-fuscous.

England to Cumberland, S. Ireland, local; C. Europe; 6, 7. Larva whitish-ochreous; dorsal line brownish; head and plate of 2 black: burrowing amongst fructification of *Asplenium*, *Scolopendrium*, and *Ceterach*, forming a small case of fragments at entrance; 3-5.

30. OCHSENHEIMERIA, *Hb.*

Head with long rough hair-scales, their tips dilated and furcate. Tongue developed. Antennae over ½, more or less thickened with rough scales towards base, in ♂ ciliated, basal joint without pecten. Labial palpi moderate, subascending, second joint with rough projecting tuft of scales beneath, terminal joint moderate, pointed. Maxillary palpi very short. Posterior tibiae loosely haired. Forewings: 1b furcate, 5 absent, 6 sometimes absent, 7 and 8 stalked or coincident.

Hindwings 1, elongate-ovate, cilia $\frac{3}{4}$-1; 3 sometimes absent, 6 and 7 stalked or coincident.

A genus of few species, apparently confined to Europe. They frequent grass-fields, and fly freely in the middle of the day (12 to 2 P.M.), but are seldom met with at other times. Imago with forewings elongate, apex pointed. Larva feeding in stems of grasses.

1. Antennae more or less thickened with scales . 2.
,, not thickened . . . 3. *vacculella.*
2. Hindwings with transparent basal patch . 1. *birdella.*
,, only thinly scaled towards base 2. *bisontella.*

1. **O. birdella**, *Curt.* 11-12 mm. Antennae thickened with rough scales to above middle. Forewings fuscous or ochreous-fuscous, mixed with lighter and darker, and with loosely raised scales. Hindwings rather dark purplish-fuscous, becoming transparent on a patch towards base.

England, N. and E. Ireland, local; Germany; 7, 8. Larva slender, whitish-yellowish; head pale yellow-brownish: in stems of grasses (*Dactylis*, *Bromus*, *Poa*, etc.); 5.

2. **O. bisontella**, *Z.* 9-12 mm. Antennae in ♂ hardly, in ♀ rather strongly thickened with rough scales to above middle. Forewings narrower than in *O. birdella*, in ♂ rather dark fuscous, in ♀ greyish-ochreous more or less mixed with fuscous. Hindwings brassy-purplish-fuscous, thinly scaled towards base.

Britain to Stirling, local; C. Europe; 7.

3. **O. vacculella**, *F.R.* 11-12 mm. Antennae not thickened. Forewings fuscous or greyish-ochreous, mixed or almost wholly suffused with dark fuscous. Hindwings rather dark fuscous, basal third transparent.

England to Durham, under dead bark of trees and in houses, local and uncommon; C. Europe; 7, 8. Larva described as pale ochreous, with brown head, feeding in stems of rye, but it seems doubtful whether the species was rightly identified.

31. SCARDIA, *Tr.*

Head rough. Tongue short. Antennae $\frac{3}{4}$, in ♂ shortly ciliated, basal joint with pecten. Labial palpi rather long, curved, ascending, second joint with projecting tuft of scales beneath, terminal joint as long as second, rather pointed. Maxillary palpi short, porrected. Posterior tibiae hairy. Forewings: 1b furcate, 7 to costa, 8 and 9 sometimes stalked. Hindwings 1, elongate-ovate, cilia $\frac{1}{2}$; 5 and 6 somewhat approximated.

A small but nearly cosmopolitan genus, of which only three species occur in Europe. Imago with forewings elongate, apex obtuse. Larva feeding in fungi and rotten wood.

1. **S. boleti**, *F.* (*choragellus*, Z.) 22-28 mm. Forewings brown, strigulated with whitish-ochreous and dark fuscous; some darker spots towards base of costa; an irregular median fascia obscurely indicated, darker and narrower on costa and dorsum; indistinct subterminal and terminal series of darker spots; terminal cilia with four light bars. Hindwings rather dark fuscous.

Hants, Essex, N. Ireland, local and scarce; C. Europe, Asia Minor; 7, 8. Larva ochreous-whitish; head brown: in fungi; 9-5.

32. SCYTHROPIA, *Hb.*

Head rough. Tongue short. Antennae $\frac{3}{4}$, in ♂ pubescent, basal joint without pecten. Labial palpi moderate, filiform, drooping, terminal joint longer than second, pointed. Maxillary palpi short, filiform. Posterior tibiae loosely haired. Forewings: 1b furcate, 7 to termen. Hindwings 1, elongate-ovate, cilia 1; 3 and 4 somewhat approximated, 6 and 7 parallel.

Besides the following there is said to be a second European species; the genus is apparently derived from *Tinea.* Imago with forewings elongate, apex tolerably pointed. Larva slender, gregarious, in a common web.

1. **S. crataegella**, *L.* 11-14 mm. Head white, fuscous-mixed. Forewings white, sprinkled with light fuscous, margins strigulated or spotted with dark fuscous; a rather dark fuscous fascia before middle, and another from $\frac{3}{5}$ of costa to tornus. Hindwings grey, darker towards apex.

England to Lancashire, local; C. Europe; 7. Larva dull reddish-brown or ochreous-brown; head brown: on hawthorn; 5, 6.

33. INCURVARIA, *Hw.*

Head rough. Tongue short. Antennae $\frac{2}{3}$, in ♂ unipectinated throughout, basal joint without pecten. Labial palpi moderate, porrected, second joint with apical bristles, terminal joint pointed. Maxillary palpi long, filiform, folded. Posterior tibiae hairy. Forewings: 1b furcate, 7 to costa. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$; all veins separate.

As here restricted, the genus includes only the two following species; it is correlated with *Lampronia.* The species fly in the sunshine. Imago with forewings elongate, moderate, apex rather obtuse; hindwings with hair-scales. Larva stout, when very young mining in leaves, thereafter cutting out a flat portable case and feeding on dead leaves on the ground.

Head pale greyish-ochreous; spots indistinct 1. *pectinea.*
,, yellowish-ochreous; spots sharply marked 2. *muscalella.*

1. **I. pectinea**, *Hw.* 12-14 mm. Head pale greyish-ochreous. Forewings shining prismatic fuscous; a yellow-whitish dorsal spot before middle, and an indistinct dot before tornus. Hindwings brassy-grey.

Britain to Sutherland, Ireland, local; N. and C. Europe, N. Asia; 5. Larva whitish; head yellow-brownish; plates of 2-4 fuscous: on birch and hazel; 6-9.

2. **I. muscalella**, *F.* (*masculella*, Hb.) 12-14 mm. Head pale ochreous, ferruginous-tinged. Forewings rather dark purplish-bronzy-fuscous; a whitish triangular dorsal spot before middle, and a smaller one before tornus. Hindwings rather dark grey.

Britain to the Clyde, N. and E. Ireland, common; Europe; 5. Larva whitish; head and plate of 2 pale brown; 3 and 4 with pairs of dark spots: on hawthorn, *Ribes*, etc.; 6-10.

34. LAMPRONIA, *Stph.*

Head rough, face with appressed hairs. Tongue short. Antennae $\frac{2}{3}$, in ♂ simple, basal joint without pecten. Labial palpi moderate, porrected, second joint with apical bristles, terminal joint moderate, somewhat pointed. Maxillary palpi long, filiform, folded. Posterior tibiae hairy. Forewings: 1b furcate, 7 to costa. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$; all veins separate.

A genus of few species, characteristic of Europe; derived from *Tinea.* Most of the species fly in the sunshine. Imago with forewings elongate, moderate, apex rather obtuse. Larva feeding in shoots, or in a portable flat case on leaves of *Rosaceae*, especially dead ones.

1. Forewings unicolorous . . . . . 2.
,, with pale markings . . . 3.
2. Tornus of forewings distinctly prominent 2. *pubicornis.*
,, ,, hardly marked . 1. *tenuicornis.*
3. Forewings with numerous pale dots . 6. *rubiella.*
,, without such dots . . . 4.
4. Head fuscous . . . . . 5.
,, light yellow-ochreous . . 5. *praelatella.*
5. Forewings with pale antemedian fascia . 4. *luzella.*
,, without antemedian markings 3. *quadripunctella.*

1. **L. tenuicornis,** *Stt.* 14-16 mm. Head whitish-yellowish. Forewings rather dark shining prismatic fuscous. Hindwings with hair-scales, grey.

Kent, Surrey, York to Westmoreland, local; Holland, Germany; 6.

2. **L. pubicornis,** *Hw.* (*flavifrontella*, Hein.; *canariella*, Stt.) 12-13 mm. Head pale yellowish. Forewings relatively broader and with termen less oblique than in *L. tenuicornis*, shining fuscous. Hindwings with hair-scales, grey.

Lancashire to the Clyde, E. Ireland, amongst *Rosa spinosissima*, local; Germany; 6.

3. **L. quadripunctella,** *Stph.* (*morosa*, Z.) 12-13 mm. Head fuscous. Forewings rather dark fuscous; a triangular dorsal spot before tornus, a discal dot above it, and sometimes a posterior dot on costa ochreous-whitish. Hindwings rather dark grey.

Britain to the Clyde, E. Ireland, common; Holland, Germany, Hungary; 6. Larva dull reddish-brown; head blackish: in shoots of rose; 4, 5.

4. **L. luzella,** *Hb.* 11-12 mm. Head fuscous. Forewings dark purple-fuscous; a sometimes interrupted fascia about $\frac{1}{4}$, a subquadrate costal spot beyond middle, and a larger triangular dorsal spot before tornus yellow; tips of apical cilia whitish. Hindwings dark fuscous.

England to Cumberland, N. and E. Ireland, common; NC. Europe; 6.

5. **L. praelatella,** *Schiff.* 11-13 mm. Head light yellow-ochreous. Forewings dark fuscous, purplish-tinged; a basal dot, a sometimes interrupted fascia at $\frac{1}{3}$, a triangular dorsal spot before tornus, and a larger costal spot beyond it pale ochreous-yellowish; tips of apical cilia white. Hindwings rather dark bronzy-grey.

Britain to Sutherland, S. Ireland, common; N. and C. Europe; 6. Larva whitish; head brown; plate of 2 blackish: in a flat case of leaf-fragments, beneath leaves of *Fragaria;* 9-5.

6. **L. rubiella,** *Bjerk.* 9-12 mm. Head light yellow-ochreous mixed with fuscous. Forewings dark fuscous, with scattered pale yellowish dots; four small costal and two larger dorsal pale ochreous-yellowish spots; tips of apical cilia whitish. Hindwings dark grey.

Britain to the Clyde, Ireland, common; N. and C. Europe, Asia Minor; 6. Larva rose-pink; head black; plate of 2 dark grey: when young in fruit-receptacles, afterwards in shoots of raspberry; 7-5.

35. MYRMECOZELA, *Z.*

Head rough. Tongue short. Antennae $\frac{3}{4}$, in ♂ pubescent, basal joint with pecten. Labial palpi moderate, porrected, second joint loosely scaled, terminal short, pointed. Maxillary palpi obsolete. Anal tuft large. Posterior tibiae hairy. Forewings: 1b furcate, 7 to costa. Hindwings 1, elongate-ovate, cilia $\frac{4}{5}$; all veins separate.

Founded on the following species only. Imago with forewings elongate, rather narrow, tolerably pointed. The habits of the larva, which is a resident in ants' nests, are apparently unique amongst known *Lepidoptera*, though shared by many *Coleoptera*. Pupa in a cocoon within the larval tubes.

1. **M. ochraceella**, *Tgst.* 15-18 mm. Head ferruginous-ochreous. Forewings rather deep ochreous. Hindwings rather dark grey.

Hants, Perth, local, perhaps overlooked; Switzerland, Finland; 6, 7. Larva whitish-yellowish; head reddish-brown: in silken galleries amongst refuse in nests of *Formica rufa;* 8-10.

36. TINEOLA, *HS.*

Head rough. Tongue short. Antennae $\frac{5}{6}$, in ♂ pubescent, basal joint with pecten. Labial palpi moderate, porrected, second joint with long bristles towards apex, terminal joint tolerably pointed. Maxillary palpi very short. Posterior tibiae loosely haired. Forewings: 1b furcate, 7 to costa. Hindwings 1, elongate-ovate, cilia nearly 1; all veins separate.

A genus of few species, very widely distributed but partly perhaps through artificial means; a development of *Tinea*, which it closely resembles. Imago with forewings elongate, rather narrow, apex tolerably pointed. Larva feeding in wool, hair, cloth, etc.

1. **T. biselliella**, *Hüm.* 9-16 mm. Head light ferruginous-ochreous, sometimes brownish-tinged. Forewings pale yellowish-ochreous; base of costa fuscous. Hindwings ochreous-grey-whitish.

Britain to the Clyde, E. Ireland, local; Europe, N. Africa, N. America, Australia, New Zealand, artificially spread; 6-9. Larva whitish; head brown: on hair, wool, etc.; 10-6.

37. ISCHNOSCIA, *n.g.*

Head rough. Tongue developed. Antennae 1, in ♂ simple, basal joint without pecten. Labial palpi rather long, porrected, second joint with apical bristles above and beneath, terminal joint pointed. Maxillary palpi long, filiform, folded. Posterior tibiae smooth-scaled. Forewings: 1b furcate, 5 absent, 7 to costa, 8 absent, 10 absent. Hindwings $\frac{2}{3}$, lanceolate, cilia 3; cell open between 4 and 5, 5 and 6 approximated.

Only the following species is at present known; it is a development of *Tinea*. Imago with forewings elongate, narrow, pointed.

1. **I. subtilella,** *Fuchs.* 6-8 mm. Head whitish-ochreous. Forewings pale whitish-ochreous; a grey apical dot. Hindwings ochreous-grey-whitish.

Dorset (Portland), amongst rocks, local; Germany; 7, 8.

38. PHYLLOPORIA, *Hein.*

Head rough. Tongue rudimentary. Antennae $\frac{3}{4}$, in ♂ shortly ciliated, basal joint without pecten. Labial palpi moderate, porrected, second joint with apical bristles, terminal joint pointed. Maxillary palpi long, filiform, folded. Posterior tibiae hairy. Forewings: 1b furcate, 5 absent, 7 to costa, 9 absent. Hindwings under 1, elongate-ovate, cilia $1\frac{1}{2}$; all veins separate.

Contains at present only the following species; derived from *Tinea*. Imago with forewings elongate, tolerably pointed. Larva tapering posteriorly, segments incised, legs hardly developed, mining in leaves. Pupa in an oval case cut out from the leaf, on the ground.

1. **P. bistrigella,** *Hw.* (*subammanella,* Stt.) 7-8 mm. Head ochreous-fuscous. Forewings fuscous; a straight shining whitish fascia at $\frac{1}{3}$, and another sometimes interrupted beyond middle; sometimes a whitish elongate discal spot beyond this. Hindwings grey.

Britain to the Clyde, local; N. Europe, Germany; 6. Larva pale yellowish; head pale brown: in a gallery terminating in a blotch in leaves of birch; 7, 8.

39. MONOPIS, *Hb.*

Head rough. Tongue developed. Antennae $\frac{3}{4}$-$\frac{5}{6}$, in ♂ simple or ciliated, basal joint with small pecten. Labial palpi moderate, porrected, second joint with long bristles at apex above and beneath, terminal joint somewhat pointed. Maxillary palpi long, filiform, folded. Posterior tibiae hairy. Forewings with naked depression in disc; 1b furcate, 3 and 4 stalked, 7 to costa, sometimes 6 and 7 or 7 and 8 stalked. Hindwings 1, elongate-ovate, cilia $\frac{3}{4}$-1; 5 and 6 sometimes stalked.

A small but quite cosmopolitan genus, derived from *Tinea*; endemic species occur in each region, but there are others whose range has been artificially extended over a large part of the world. The genus shows more structural variation than *Tinea*, especially in neuration, but the stalking of veins 3 and 4 of the forewings is a constant character for distinction. Imago with forewings elongate, rather narrow, tolerably pointed. Larva feeding on dry vegetable substance and various refuse, especially of an excrementitious nature.

1. Head and thorax white . . . 5. *monachella*.
,, ,, not white . . . 2.
2. Forewings with yellowish dorsal streak 2. *ferruginella*.
,, without dorsal streak . . 3.
3. Head yellowish . . . . . 4.
,, fuscous mixed with pale ochreous 3. *fenestratella*.
4. Costa slenderly yellowish beyond middle 1. *imella*.
,, without yellowish streak . . 4. *rusticella*.

1. **M. imella**, *Hb.* 11-13 mm. Head ferruginous-yellowish. Forewings purplish-fuscous, with some pale ochreous scales; costa slenderly pale ochreous-yellowish from before middle to $\frac{4}{5}$; a small ochreous-whitish subhyaline median discal spot. Hindwings bronzy-grey.

Kent, Suffolk to Cambridge, Lancashire, local; C. and S. Europe, Asia Minor; 6, 7. Larva in fur-refuse, felt, etc.; 10-4.

2. **M. ferruginella**, *Hb.* 10-12 mm. Head ferruginous-yellowish. Forewings dark fuscous, purplish-tinged, towards costa sprinkled with whitish-ochreous; an ochreous-yellowish dorsal streak from near base to tornus, broadest before middle; a whitish subhyaline median discal spot. Hindwings purplish-fuscous.

Britain to the Clyde, E. Ireland, local; C. and S. Europe, Asia Minor, N. Africa, N. America, Australia, New Zealand, spread by artificial means; 6, 7, 10. Larva in a case on seeds of *Artemisia* and doubtless other plants; 8-4.

3. **M. fenestratella**, *Heyd.* 11-14 mm. Head fuscous,

mixed with pale ochreous. Forewings dark fuscous, purplish-tinged, somewhat mixed with brownish-ochreous; an obscure rather large triangular brownish-ochreous or ochreous-yellowish dorsal spot before tornus, and another on costa nearly opposite; an ochreous-whitish median discal spot. Hindwings bronzy-grey.

Surrey, Cambridge, local; Germany; 6, 7. Larva in decayed wood; 10-4.

4. **M. rusticella**, *Hb.* 14-20 mm. Head light yellow-ochreous. Forewings purplish-grey, densely strigulated with dark fuscous and more or less irrorated with whitish-ochreous; a small whitish hyaline discal spot before middle; sometimes a small whitish-ochreous tornal spot. Hindwings brassy-grey, posteriorly purplish-tinged.

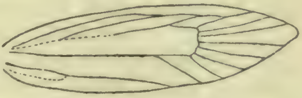
Britain to the Shetlands, E. Ireland, common; N. and C. Europe, Asia Minor, N. America; 5, 6, 8, 9. Larva whitish; head pale brown; plate of 2 yellowish-brown: on wool, probably also on various refuse; 7, 8, 10-3.

5. **M. monachella**, *Hb.* 11-17 mm. Head and thorax white. Forewings less narrow, dark ferruginous-fuscous, with numerous small dark ashy-fuscous spots; an ochreous-white trapezoidal blotch extending along costa from before middle to near apex and reaching half across wing, lower side sinuate; a subhyaline spot in lower anterior angle of this. Hindwings brassy-grey, darker posteriorly.

Cambridge, in fens, local; NC. Europe, India, Hawaiian Isles, doubtless artificially distributed; 5, 6, 8.

40. TRICHOPHAGA, *Rag.*

Characters of *Tinea*, but forewings with 10 running into 9 before costa, 11 running into 10, 12 running into 11, these three veins not reaching the costa.



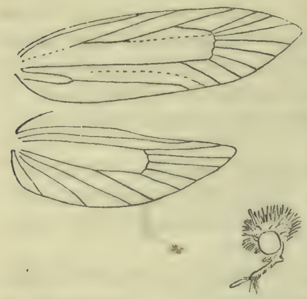
Forewing of *Trichophaga tapetiella*.

The single European species is now of world-wide distribution and doubtful origin; two other species are known from Africa. Imago with forewings elongate, rather narrow, apex round-pointed. Larva feeding especially on furs, skins, etc.

1. **T. tapetiella**, *L.* 15-22 mm. Head white. Forewings ochreous-white, thinly strigulated with grey; basal $\frac{2}{5}$ dark purplish-fuscous; a roundish grey posterior discal spot; some small black spots about apex. Hindwings light brassy-grey.

Britain to Caledonian Canal, Ireland, common; Europe, Asia, Africa, N. America, Australia, New Zealand; 6, 7. Larva ochreous-whitish; head brown: in silken galleries amongst fur and woollen stuffs; 9-4.

41. TINEA, *L.*



Neuration and head of *Tinea lapella.*

Head rough. Tongue short. Antennae $\frac{3}{4}$-$\frac{5}{6}$, in ♂ simple or ciliated, basal joint sometimes with small pecten. Labial palpi moderate, porrected, second joint sometimes rough beneath, with long apical bristles above and beneath, terminal joint somewhat pointed. Maxillary palpi long, filiform, folded. Posterior tibiae loosely haired. Forewings: 1b furcate, 7 to costa, seldom 5 and 6 or 6 and 7 or 7 and 8 stalked. Hindwings $\frac{3}{4}$-1, elongate-ovate, cilia $\frac{2}{3}$-1; 5 and 6 sometimes stalked.

An extensive genus of universal distribution; all regions possess numerous endemic forms, though a few of the house-frequenting species have been widely spread by human agency. Imago with forewings elongate, rather narrow, tolerably pointed. Larva of various habits, sometimes living in a portable case; most of the European species feed on dry refuse, lichens, fungi, dead wood, cloth, etc., but in other regions many live in spun shoots or mine blotches in leaves.

1. Forewings with discal scale-tufts at $\frac{3}{4}$ 15. *angustipennis.*
,, without scale-tufts . . . 2.
2. Forewings dark fuscous . . . . 3.
,, not dark fuscous . . . 12.
3. Forewings with pale spots . . . 4.
,, without pale spots . 22. *simplicella.*
4. Head yellow . . . . . 5.
,, not yellow . . . . 9.
5. Forewings with whitish costal spot before middle
3. *fulvimitrella.*
,, without such spot . . . 6.
6. Forewings with whitish spot on base of dorsum
12. *caprimulgella.*
,, without such spot . . . 7.

7. Forewings with antemedian fascia . . 8.
,, without fascia . . 2. *oehlmanniella.*
8. Forewings with two posterior costal spots 23. *vinculella.*
,, ,, one costal spot . . 1. *capitella.*
9. Forewings with one or more fasciae . . 10.
,, without fascia . . . . 11.
10. Forewings with postmedian fascia . 13. *confusella.*
,, without postmedian fascia 24. *argentimaculella.*
11. Head whitish . . . 11. *albipunctella.*
,, ferruginous-brown . . . 16. *misella.*
12. Head deep ferruginous . . 21. *semifulvella.*
,, not ferruginous . . . . 13.
13. Head yellow . . . . . 14.
,, not yellow . . . . . 15.
14. Forewings with dark brown costal spots . 6. *parasitella.*
,, without dark costal spots . 20. *lapella.*
15. Forewings white or whitish-mixed . . 16.
,, not mixed with whitish . . 22.
16. Forewings with basal fourth of costa dark fuscous
4. *arcella.*
,, without such mark . . . 17.
17. Forewings with black streak from base to apex
8. *picarella.*
,, without such streak . . . 18.
18. Forewings with blackish streak from disc to costa
before apex . . 7. *arcuatella.*
,, without such streak . . . 19.
19. Forewings with inverted-triangular median dorsal
spot . . . 5. *corticella.*
,, without such spot . . . 20.
20. Forewings with dark median entire fascia
14. *nigripunctella.*
,, without such fascia . . . 21.
21. Head whitish . . . . 9. *granella.*
,, whitish-ochreous . . . 10. *cloacella.*
22. Forewings with dark basal subdorsal dash
19. *pallescentella.*
,, without such dash . . . 23.
23. Costal cilia barred . . 17. *fuscipunctella.*
,, ,, not barred . . . 18. *pellionella.*

1. **T. capitella**, *Cl.* 14-16 mm. Head deep ochreous-yellow. Forewings rather broad, dark purplish-bronzy-fuscous; a fascia at $\frac{1}{3}$, attenuated upwards and sometimes not reaching costa, a

rounded dorsal spot before tornus, and another on costa slightly beyond it light yellowish; tips of apical cilia yellow-whitish. Hindwings rather dark purplish-grey.

England to York, N. Ireland, local; C. Europe; 5, 6. Larva dull greenish; a reddish spot on 9; head and plate of 2 black: in shoots of currant (*Ribes*); 4.

2. **T. oehlmanniella**, *Tr.* 12-14 mm. Head deep ochreous-yellow. Forewings dark bronzy-fuscous, mixed with purplish; a subtriangular dorsal spot before middle, a smaller one before tornus, and a third sometimes nearly obsolete on costa at $\frac{3}{4}$ pale yellowish. Hindwings rather dark purplish-grey.

Britain to the Orkneys, rather common; N. and C. Europe; 6. Larva when young mining in leaves, afterwards in a flat case of leaf-fragments on various fallen leaves; 8-3.

3. **T. fulvimitrella**, *Sodof.* 17-20 mm. Head ochreous-yellow. Forewings blackish, faintly purplish-tinged; ochreous-whitish subtriangular spots on costa before middle and at $\frac{3}{4}$, and on dorsum before middle and before tornus, sometimes containing one or two dark strigulae; cilia with three or four whitish spots. Hindwings rather dark purplish-grey.

Britain to Perth, local; N. and C. Europe; 6. Larva yellow-whitish; head dark brown, blackish above; 2 with two brown spots: in decayed wood and fungi; 5.

4. **T. arcella**, *F.* 12-14 mm. Head white. Forewings whitish, partially ochreous-tinged; a thick mark along basal $\frac{1}{4}$ of costa, a median fascia angulated above middle and sometimes nearly interrupted below angle, and two or three posterior costal marks dark fuscous. Hindwings grey.

England to Durham, N. Ireland, rather common; C. Europe, Asia Minor; 6-8. Larva in decayed wood; 5.

5. **T. corticella**, *Curt.* (*emortuella*, Z.) 13-16 mm. Head ochreous-white. Forewings whitish, suffusedly strigulated with yellowish-brown; several small dark fuscous spots on costa, and some smaller on dorsum and termen; a triangular yellowish-brown median dorsal spot standing on one angle; a yellowish-brown transverse subterminal streak. Hindwings fuscous.

England, E. Ireland, local; C. Europe; 5, 6, 8. Larva yellow-whitish; head and plate of 2 brown: in fungi growing on trees; 7, 9, 10.

6. **T. parasitella**, *Hb.* (*carpinetella*, Stt.) 17-20 mm. Head ochreous-yellow. Forewings whitish, mixed with brownish-ochreous, with small scattered dark fuscous strigulae, veins marked with brownish-ochreous streaks; several dark brown

costal spots, one before and one beyond middle connected by indistinct converging brownish fasciae with a median dorsal spot; some dark brown spots towards apex; cilia barred with whitish and dark brown. Hindwings purplish-fuscous.

England, local; C. Europe, Asia Minor; 5, 6. Larva yellow-whitish; head and plate of 2 brown: in fungi growing on trees; 10-4.

7. **T. arcuatella**, *Stt.* 15-19 mm. Head brownish, on sides whitish. Forewings whitish, irrorated with brown; several small costal spots, a short longitudinal streak from base of costa, a sinuate streak along fold from base to middle, and an irregular sinuate streak from middle of disc to costa before apex blackish, partly suffused with brown. Hindwings rather dark grey.

Perth, local; N. and C. Europe; 6, 8. Larva in fungi growing on trees; 7, 9.

8. **T. picarella**, *Cl.* 13-17 mm. Head white. Forewings white; a sinuate longitudinal streak from base of costa through disc to apex, oblique costal spots at $\frac{1}{4}$ and $\frac{1}{2}$ connected with it, a longitudinal mark from base of dorsum, an oblique discal mark before middle, a dot on dorsum towards base, and some small posterior costal and terminal spots black. Hindwings rather dark grey, paler anteriorly.

Cheshire to Perth, local; N. and C. Europe; 7.

9. **T. granella**, *L.* 9-14 mm. Head whitish. Forewings whitish, irregularly irrorated with fuscous and dark fuscous; an oblique mark from base of costa to fold, a smaller mark beyond it, an oblique mark from costa to middle of disc, a spot on fold before middle, and some small costal and dorsal spots dark fuscous. Hindwings grey.

England, N. and E. Ireland, common, in established granaries sometimes very abundant; Europe, WC. Asia to N. Persia, N. Africa, N. America, Australia, spread by artificial means; 6-9. Larva yellowish-white; head pale brown; plate of 2 paler brownish: on corn-grains; 7-10.

10. **T. cloacella**, *Hw.* (*ruricolella*, Stt.) 10-17 mm. Head whitish-ochreous. Forewings ochreous-brown, more or less mixed with whitish and strigulated with dark fuscous; a spot on base of costa, another beyond it, a thick oblique spot from costa reaching middle of disc, an elongate spot on fold before middle, and some small posterior costal and dorsal spots dark fuscous; a small round whitish posterior spot in disc. Hindwings fuscous.

Britain to Perth, Ireland, common; C. Europe, WC. Asia to Turkestan, N. America; 6-8. Larva yellowish-white; head pale brown: in fungi and decayed wood; 7, 9-4.

(*T. cochylidella*, Stt., founded on a specimen taken 40 years ago and still unique, seems hardly entitled to rank as a British species; it is not known in Europe, and if really a distinct species, may have been accidentally imported.)

11. **T. albipunctella**, *Hw.* 10-12 mm. Head whitish. Forewings dark fuscous; about five small costal and three dorsal spots, two above dorsum before middle and before tornus, and one in disc posteriorly whitish. Hindwings dark grey.

England to Westmoreland, local; Sweden; 6, 7. Larva in decayed sticks; 4, 5.

12. **T. caprimulgella**, *HS.* 9-11 mm. Head ochreous-yellowish. Forewings dark bronzy-fuscous; a spot on base of dorsum, an indistinct fascia before middle, two or three posterior costal spots, and one on tornus yellow-whitish. Hindwings purplish-fuscous.

Middlesex, local; France, Germany; 7. Larva in decayed wood; 5.

13. **T. confusella**, *HS.* 7-8 mm. Head whitish, at back of crown dark fuscous. Forewings dark fuscous; a basal spot, two fasciae before and beyond middle, and a costal spot before apex formed of whitish irroration. Hindwings grey.

Lancashire, E. Ireland, on rocks, local; Austria, Dalmatia; 7, 8. Larva probably on lichens.

14. **T. nigripunctella**, *Hw.* 9-10 mm. Head ochreous-whitish. Forewings ochreous-whitish, with a few dark fuscous scales; an oblique spot on base of costa reaching fold, a thick median fascia, a less defined fascia at $\frac{3}{4}$, and some undefined terminal marks fuscous irrorated with blackish. Hindwings grey.

England to York, in outbuildings, local; C. Europe, N. Africa; 7, 8.

15. **T. angustipennis**, *HS.* 13-14 mm. Head ochreous-yellow. Forewings narrow, ochreous-brown, mixed and strigulated with darker; several whitish costal and dorsal dots; obscure somewhat darker fasciae before and beyond middle; two darker scale-tufts transversely placed at $\frac{3}{4}$, surrounded by some whitish scales. Hindwings bronzy-fuscous.

Middlesex, rare and local; Holland, Germany; 5, 8. Larva said to feed in decayed wood.

16. **T. misella**, *Z.* 12-16 mm. Head ferruginous-brown.

Forewings dark brown, with numerous small yellow-whitish spots or strigulae; stigmata indistinct, dark fuscous. Hindwings purplish-fuscous.

England to York, E. Ireland, local; C. Europe, N. America; 6, 8, 11. Larva in a case, on preserved skins, dried plant-stems, fungi, etc.; 7, 9, 10, 12-4.

17. **T. fuscipunctella**, *Hw.* 11-16 mm. Head ochreous-brownish. Forewings greyish-ochreous or pale fuscous, irregularly mixed with darker fuscous; indistinct darker dorsal spots before middle and at tornus; stigmata dark fuscous, second discal large; costal cilia with paler bars. Hindwings bronzy-grey.

England, E. Ireland, common; Europe, WC. Asia to Turkestan, N. Africa, N. America, Australia, New Zealand; 6, 7, 9. Larva in a case on dry refuse; 7, 8, 10.

18. **T. pellionella**, *L.* (*flavescentella*, Hw.; *merdella*, Z.; *dubiella*, Stt.) 10-13 mm. Head light ochreous. Forewings pale greyish-ochreous, sometimes tinged with yellowish or fuscous; stigmata fuscous, two anterior sometimes elongate or seldom obsolete, second discal large, round; cilia whitish-ochreous. Hindwings rather light bronzy-grey.

Britain to Perth, Ireland, common; Europe, Asia Minor, N. America; 6, 7, 9, 10. Larva whitish; head brown; plate of 2 dark brown: in a case on cloth, feathers, hair, etc., 3-5, 7, 8.

19. **T. pallescentella**, *Stt.* 14-16 mm. Head light greyish-ochreous, fuscous-mixed. Forewings light greyish-ochreous mixed with fuscous; base of costa and a short basal subdorsal dash dark fuscous; stigmata dark fuscous, elongate, plical forming a more or less extended dash along fold; two indistinct whitish dots beyond second discal; some cloudy dark fuscous terminal spots. Hindwings very pale grey.

England to Durham, E. Ireland, local; not recorded elsewhere, but probably originally introduced from abroad and now established; 7, 8, 10. Larva on grain, dry refuse, etc.; 5, 6, 9.

20. **T. lapella**, *Hb.* (*ganomella*, Tr.) 13-16 mm. Head ochreous-yellow. Forewings pale yellowish-ochreous, more or less sprinkled with fuscous; a blackish costal streak from base to $\frac{1}{3}$ or beyond; stigmata black, plical large, first discal often absent. Hindwings grey, faintly purplish or brassy-tinged, darker posteriorly.

England to Lancashire, E. Ireland, rather common; C. Europe, Asia Minor; 6, 8. Larva in nests of birds; 7, 10-5.

21. **T. semifulvella**, *Hw.* 15-19 mm. Head deep ferruginous. Forewings whitish-grey, irregularly suffused with pale ferruginous, posteriorly suffused with ferruginous-orange; a dark fuscous costal streak from base to $\frac{1}{2}$; a small elongate-triangular blackish dorsal spot before tornus. Hindwings grey.

Britain to Perth, rather common; C. Europe; 6, 7. Larva yellowish-white; head pale brown: on wool, etc., in nests of birds; 10-5.

22. **T. simplicella**, *HS.* 11-13 mm. Head ferruginous-ochreous. Forewings rather dark fuscous, purplish-tinged, sometimes obscurely yellowish-sprinkled; stigmata sometimes faintly indicated; costal edge posteriorly pale yellowish. Hindwings purplish-fuscous.

Kent, Surrey, local; C. Europe; 7.

23. **T. vinculella**, *HS.* 8-9 mm. Head pale ochreous-yellowish. Forewings blackish-fuscous; a narrow somewhat curved fascia before $\frac{1}{3}$, an oblique triangular spot on middle of costa, another before tornus seldom connected with this, and a crescentic costal spot towards apex white; tips of cilia whitish. Hindwings rather dark fuscous, faintly brassy-tinged.

Dorset (Portland), local; C. Europe; 7. Larva pale yellowish; head and plate of 2 rather dark brown: in a rather flat case covered with sand and lichen-fragments, on lichens on rocks; 8-10, sometimes living two years.

24. **T. argentimaculella**, *Stt.* 8-9 mm. Head light fuscous, face whitish. Forewings blackish-fuscous; a narrow fascia at $\frac{1}{3}$, sometimes interrupted on fold, an oblique mark from middle of costa, a small dorsal spot before tornus, a dot above tornus, a small posterior costal spot, and some dots round apex and termen shining silvery-white; tips of cilia silvery-whitish. Hindwings rather dark fuscous.

Surrey, Dorset to Lancashire, local; C. Europe; 7. Larva green-whitish; head and plate of 2 black; 3 and 4 with darker lateral spots: in galleries amongst lichens on rocks; 4-6.

42. NEMOPHORA, *Hb.*

Head rough, face with appressed hairs. Tongue developed. Antennae 2-3, in ♂ filiform, basal joint without pecten. Labial palpi short, porrected, loosely scaled. Maxillary palpi long, filiform, folded. Posterior tibiae hairy. Forewings: 1b furcate, 7 to termen, 8 and 9 stalked. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$; 5 and 6 approximated or stalked.

Includes only a few European species, very closely allied together; the genus is correlated with *Nemotois.* Imago with forewings elongate, moderate, apex round-pointed, termen obliquely rounded; hindwings with hair-scales. Larva at first mining in leaves, afterwards feeding in a portable case.

1. Second discal stigma marked . . . 2.
„ „ not marked . . . 3.
2. Forewings long, rather narrow . 2. *schwarziella.*
„ rather short and broad . 4. *metaxella.*
3. Cilia of hindwings whitish-ochreous 1. *swammerdammella.*
„ „ grey . . . 3. *pilella.*

1. **N. swammerdammella,** *L.* 16-21 mm. Head orange, face whitish. Forewings long, pale shining ochreous, faintly darker-strigulated. Hindwings pale grey; cilia whitish-ochreous.

Britain to Sutherland, E. Ireland, common; C. Europe, WC. Asia to N. Persia; 5, 6. Larva whitish; head and plate of 2 black; 3 and 4 with narrow purplish-brown plates: in a flat case of leaf-fragments, on various low plants and fallen leaves; 8-4.

2. **N. schwarziella,** *Z.* 15-17 mm. Head orange. Forewings long, light shining greyish-ochreous, indistinctly strigulated with grey; a grey discal mark beyond middle. Hindwings light grey; cilia whitish-grey.

Britain to Sutherland, N. and E. Ireland, common; C. Europe; 5, 6.

3. **N. pilella,** *F.* 15-17 mm. Head orange, face whitish. Forewings less elongate, shining greyish-ochreous or light fuscous, faintly darker-strigulated. Hindwings grey; cilia grey.

York to Sutherland, local; C. Europe, Asia Minor; 6.

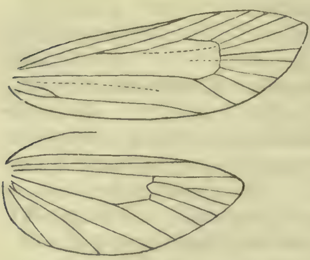
4. **N. metaxella,** *Hb.* 15-17 mm. Head ochreous-orange, face whitish. Forewings shorter and broader, shining ochreous, indistinctly brownish-strigulated; a brownish discal mark beyond middle. Hindwings fuscous; cilia light grey, suffused basally with ochreous.

England to Westmoreland, N. Ireland, local; N. and C. Europe; 6.

43. Adela, *Latr.*

Head rough, face usually smooth. Tongue developed. Antennae $1\frac{1}{4}$-3, in ♂ filiform, sometimes thickened with scales towards base, basal joint without pecten. Labial palpi moderate or short, porrected, more or less hairy. Maxillary palpi rudimentary. Posterior tibiae hairy. Forewings: 1b furcate, 7 to costa, 8 and 9 sometimes stalked. Hindwings 1, elongate-ovate, cilia ½-¾; 5 and 6 approximated or stalked, 6 and 7 sometimes stalked.

A rather considerable genus, almost confined to northern temperate regions. Imago with forewings elongate, moderate, apex round-pointed; the species fly in hot sunshine. Larva usually at first in flowers, afterwards in a flat case on leaves, especially when fallen.



Neuration of *Adela viridella*.

1. Forewings with entire yellow fascia 2.
Forewings without entire fascia . . 3.
2. Forewings with 8 and 9 stalked 4. *degeerella*.
Forewings with 8 and 9 separate 3. *croesella*.
3. Antennae of ♂ almost wholly white; expanse 14-16 mm. . . 4.
,, ,, white towards apex only; expanse 8-12 mm. . . . 5.
4. Forewings brassy-bronzy; antennae of ♀ thickened 5. *viridella*.
,, coppery-bronzy; antennae of ♀ not thickened . . . 6. *cuprella*.
5. Head black; forewings with pale spot . 1. *fibulella*.
,, ferruginous-mixed; forewings usually unicolorous . . . 2. *rufimitrella*.

1. **A. fibulella**, *Schiff*. 8-10 mm. Head black. Antennae 1¼, black, apical fourth white. Forewings shining coppery-bronzy, costa posteriorly purple; sometimes a pale yellowish spot near base; a pale shining yellowish transverse dorsal spot beyond middle, sometimes nearly reaching costa. Hindwings dark purplish-fuscous.

Britain to Ross, rather common; C. Europe, Asia Minor; 6. Larva whitish; head and plate of 2 dark brown; plate of 3 and two spots on 4 greyish: in seed-capsules, afterwards in flat elongate-oval cases granulated with earth on leaves of *Veronica chamaedrys*; 7-9. The colouring of the imago practically accords well with the *Veronica* flowers, the pale spot imitating the white eye of the blossom.

2. **A. rufimitrella**, *Sc*. 9-12 mm. Head black, more or less ferruginous-mixed above. Antennae in ♂ 2, in ♀ 1½, black, tip

whitish. Forewings shining brassy-bronzy, sometimes partly or wholly coppery. Hindwings dark purplish-fuscous.

England to York, N. Ireland, local; C. Europe; 5. Larva whitish-yellowish; head and plate of 2 blackish; 3 and 4 fuscous above: in seed-vessels, afterwards in flat rounded-elongate brown cases on leaves of *Cardamine pratensis* and *Sisymbrium alliaria;* 7-10. In Continental specimens the forewings have sometimes a pale yellowish dorsal spot beyond middle.

3. **A. croesella,** *Sc.* (*sulzella,* Schiff.) 11-13 mm. Head ferruginous mixed with black. Antennae in ♂ 2½, black, tip white; in ♀ hardly 1¼, thickened with violet-black scales to above middle, remainder white. Forewings shining dark violet-fuscous, more or less streaked suffusedly between veins with golden-ochreous; a straight deep yellow fascia close beyond middle, narrower costally, edged first with dark fuscous and then with narrow violet fasciae. Hindwings dark purplish-fuscous.

England to York, local; C. Europe, WC. and N. Asia; 6. Larva whitish; head and plate of 2 brown: when young probably in the blossoms, afterwards in a flat case granulated with earth on fallen leaves of *Ligustrum;* 8-3.

4. **A. degeerella,** *L.* 15-19 mm. Head ferruginous-yellowish. Antennae in ♂ over 3, white, becoming dark fuscous towards base; in ♀ 1⅓, thickened with black scales on lower half, towards apex white. Forewings light shining yellow-ochreous, veins streaked with dark fuscous, in ♀ posteriorly sometimes wholly dark fuscous; a yellow fascia at ⅗, slightly inwardly oblique, edged with narrow violet-leaden blackish-edged fasciae; 8 and 9 stalked. Hindwings dark purplish-fuscous; 6 and 7 stalked.

England to Cumberland, S. Ireland, common; Europe, Asia Minor; 6. Larva yellowish-white; head and plate of 2 black; 3 and 4 with grey spots: in broad flat case of leaf-fragments on various low plants and fallen leaves; 9-3.

5. **A. viridella,** *Sc.* 14-16 mm. Head black, in ♀ sometimes ochreous-mixed, face in ♀ smooth. Antennae in ♂ nearly 3, white above; in ♀ 1¼, black, thickened towards base, towards apex white. Forewings bright shining brassy-bronzy, costa coppery-tinged. Hindwings dark purplish-fuscous.

England, very common; Europe, Asia Minor; 5, 6. Larva in broad flat case of leaf-fragments on fallen leaves; 9-3. Egg laid in midrib of leaf.

6. **A. cuprella,** *Thnb.* 14-15 mm. Head in ♂ black, in

♀ ferruginous, face in ♀ hairy. Antennae in ♂ $2\frac{1}{2}$, white, towards base blackish-ringed; in ♀ $1\frac{1}{4}$, black, not thickened, towards apex white. Forewings coppery-bronzy, towards costa purple-tinged. Hindwings dark purplish-fuscous.

Britain to Sutherland, E. Ireland, very local; N. and C. Europe; 4. The imago frequents flowers of *Salix caprea.*

44. NEMOTOIS, *Hb.*

Head rough; face smooth. Eyes in ♂ enlarged, approximated on crown. Tongue developed. Antennae in ♂ about 3, in ♀ $1\frac{1}{2}$ or more, in ♂ simple, basal joint without pecten. Labial palpi moderate, curved, ascending, shorter in ♀, with long rough projecting hairs in front, terminal joint pointed. Maxillary palpi obsolete. Abdomen in ♀ much narrowed posteriorly. Posterior tibiae hairy. Forewings: 1b furcate, 7 to costa. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$; 6 and 7 approximated or stalked.

A rather small genus but distributed throughout all the principal regions except New Zealand. Imago with forewings elongate, moderate, apex rounded; the species fly in hot sunshine. Larva at first in seedheads, afterwards in a flat case on lower leaves.

1. Forewings with well-marked dark fascia . 4. *fasciellus.*
   ,, without distinct fascia . . 2.
2. Forewings with blackish subcostal basal dash 3. *minimellus.*
   ,, without such dash . . . 3.
3. Forewings long, rather shining . . 1. *scabiosellus.*
   ,, rather short, brightly shining 2. *cupriacellus.*

1. **N. scabiosellus,** *Sc.* (? *metallicus,* Pod.) 15-20 mm. Head ferruginous. Antennae in ♂ roughened with scales above towards base. Abdomen of ♀ very much attenuated posteriorly. Forewings long, rather shining golden-bronzy, somewhat coppery-tinged. Hindwings dark purplish-fuscous.

S. England to Norfolk and Denbigh, local; N. and C. Europe; 6, 7. Larva whitish; head and plates of 2-4 black: in seedheads of *Scabiosa arvensis* and *S. columbaria,* afterwards in flat cases of leaf-fragments on leaves: 8-10.

2. **N. cupriacellus,** *Hb.* 14-15 mm. Head ferruginous, forehead in ♂ black. Antennae in ♂ with basal $\frac{1}{8}$ clothed with rough scales above, in ♀ gradually thickened towards base. Forewings shining golden-bronze, usually more coppery posteriorly; sometimes a faintly indicated darker postmedian fascia. Hindwings dark purplish-fuscous.

England to Cumberland, rather local; C. Europe; 6. Larva variously stated to feed on *Scabiosa* or *Sedum*.

3. **N. minimellus**, *Z.* 11-14 mm. Head in ♂ black, in ♀ ferruginous. Forewings golden-bronzy, becoming coppery posteriorly, base more brassy; a blackish basal dash beneath costa; a very obscurely marked violet-brownish postmedian shade. Hindwings dark purplish-fuscous, in ♂ sometimes whitish except apex.

Britain to the Clyde, local; C. Europe; 7. Larva whitish; head and plate of 2 black; 3 and 4 grey above: in seed-heads, afterwards in flat cases of leaf-fragments on leaves of *Scabiosa succisa* and *S. columbaria;* 9-4.

4. **N. fasciellus**, *F.* (*schiffermillerella*, Schiff.) 13-14 mm. Head in ♂ black, in ♀ ferruginous. Forewings shining purplish-coppery, base brassy-bronzy; a short black subcostal dash near base; a blackish-violet fascia beyond middle, dilated towards costa. Hindwings dark fuscous.

Kent, Suffolk, Cambridge, local; C. Europe; 7. Larva whitish; head and plate of 2 black; 3 and 4 with pairs of dark grey spots: on seeds, afterwards in flat cases of leaf-fragments on leaves of *Ballota nigra;* 9-4.

9. MICROPTERYGINA.

Forewings with an oblique membranous dorsal process (jugum) near base, forming with the dorsal margin a notch or sinus which receives the costa of the hindwings. Hindwings without frenulum, 1c present, with 11 or more veins, neuration essentially almost or quite identical with that of forewings. Forewings and hindwings more than usually remote at origin.

In the two families which constitute this highly interesting group is fortunately preserved a type of *Lepidoptera*, whose existence could never have been inferred from a study of other forms. Without a knowledge of these two families the true origin of the Order could never have been more than a matter of more or less probable conjecture. The *Micropterygidae* are the primeval ancestors of all the *Lepidoptera*, indicating their origin from the *Trichoptera* so nearly that one or two more discoveries might make it hard to draw any line of demarcation. The *Hepialidae* are an offshoot from the *Micropterygidae* (with considerable extinction of intermediate forms), constituting a separate line of development quite unconnected with any other *Lepidoptera;* if, as is possible, this separate stem may have ever given rise to other branches forming distinct families, all trace of their existence seems to have been lost.

Imago with forewings and hindwings more or less semioval, termen and dorsum forming a nearly uniform curve.

Type of markings: forewings with an irregular marbling or reticulation, tending to form transverse fasciae; hindwings without marking.

Larva with few hairs, with 10-16 prolegs, or apodal, living concealed.

Pupa in *Hepialidae* with segments 7-11 and in ♂ 12, in *Micropterygidae* with all segments free.

Tabulation of Families.

Maxillary palpi well-developed; tibial spurs present	2. Micropterygidae.
„ „ obsolete; no tibial spurs	1. Hepialidae.

1. HEPIALIDAE.

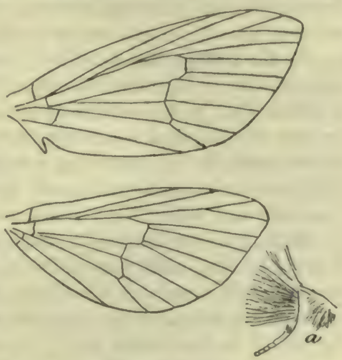
Head rough. Ocelli absent. Tongue obsolete. Maxillary palpi obsolete. Tibiae without spurs. Forewings: all main veins and costa connected by bars near base, 1b furcate, forked parting-vein strong.

By no means an extensive family, yet of universal distribution. It stands more conspicuously isolated than any other group of *Lepidoptera*, for although it is without doubt a terminal development from the *Micropterygidae* (that is, one from which no existing family has originated), the gap between them is considerable; exotic genera, whilst differing in various details, are remarkably uniform in the more important peculiarities of structure, and do not at all tend to bridge the gap. The relatively large size of the *Hepialidae* (of which some exotic species exceed six inches in expanse of wing) may be attributed to the larval habits, which render these insects independent of the seasons or fluctuations of food-supply, thus removing the check which ordinarily limits growth. The modified type of neuration may have resulted directly from the increase of size, involving a great strengthening of the main veins beneath the costa to support the weight. As a consequence of this strengthening, the flight of the larger species is very powerful; and to this, combined with a choice of larval food which is often rather indiscriminate, may perhaps be ascribed the wide range of the group, rather than to its antiquity.

It is probably of Indo-Malayan origin, and must have existed in that region long enough to acquire fixity of type before its dispersal, which, geologically speaking, may not have been exceedingly remote.

1. Hepialus, *F.*

Antennae $\frac{1}{8}$-$\frac{1}{4}$, in ♂ lamellate or simple. Palpi short, drooping, hairy. Posterior tibiae usually densely rough-haired, in ♂ sometimes with long projecting tuft above. Forewings: 7 from angle, 8 remote, 9 and 10 stalked. Hindwings as forewings, 8 seldom connate or stalked with 7.



Neuration of *Hepialus humuli*; *a*, posterior leg of ♂.

A genus of universal distribution, but not very numerous in species. Ovum spheroidal, smooth. Larva elongate, active, subterranean, feeding on roots, often living two years. Pupa subterranean, with segmental whorls of spines, enabling it to move actively and rise to the surface before emergence.

1. Forewings with two series of yellowish-silvery spots . . . 1. *hectus* ♂.
,, without such spots . . . 2.
2. Cilia conspicuously barred . . . 3. *velleda.*
,, not barred . . . 3.
3. Hindwings towards apex reddish-tinged . . 4. *sylvinus.*
,, not reddish-tinged . . . 4.
4. Forewings pale yellow-ochreous or white . 5. *humuli.*
,, brownish-ochreous or fuscous . . 5.
5. Fasciae of forewings pale fuscous . . 1. *hectus* ♀.
,, ,, whitish or obsolete . 2. *lupulinus.*

1. **H. hectus**, *L.* 26-30 mm. Antennae in ♂ simple. Posterior tibiae in ♂ short, much swollen, with dense tuft of hairs, posterior tarsi in ♂ absent. Forewings in ♂ deep reddish-golden-ochreous, with a basal spot, antemedian series of four adjacent spots not reaching costa, postmedian irregular interrupted series of about ten spots, and sometimes some small terminal spots yellowish-silvery; in ♀ fuscous, with pale fusc-

ous antemedian and irregular postmedian bands, former not reaching costa. Hindwings in ♂ dark fuscous, in ♀ fuscous.

Britain to Sutherland, E. Ireland, rather local; N. and C. Europe, N. Asia; 6. Larva slender, pale greyish-ochreous; head, plate of 2, and several small plates on 3 and 4 shining blackish-brown: in root-stocks and eventually shoots of *Pteris aquilina;* 7-6, living two years. The ♂ emits a strong perfume (compared to pine-apple) from the tibial tuft; this serves to attract the ♀, which seeks for and flies against the ♂.

2. **H. lupulinus**, *L.* 24-38 mm. Antennae in ♂ simple. Forewings light fuscous or ochreous-fuscous; an irregular whitish dark-edged streak from middle of base to near dorsum before middle, and a similar streak from costa before apex to above middle of dorsum, sometimes incomplete; a whitish longitudinal discal mark; all markings more indistinct in ♀, variable and sometimes wholly obsolete. Hindwings fuscous.

Britain to the Orkneys, Ireland, common; C. Europe; 5, 6. Larva slender, ochreous-whitish; head and plate of 2 brown: on roots of *Lamium*, *Plantago*, *Narcissus*, etc.; 7-4, living two years. In this and the two following species the ♂ is attracted by the ♀ in the usual way.

3. **H. velleda**, *Hb.* 30-48 mm. Antennae in ♂ simple. Forewings light brown-reddish, mixed with fuscous and dark fuscous; various irregular markings on anterior half, and an irregular postmedian band furcate towards costa and not reaching dorsum paler, dark-edged, enclosing central whitish dark-edged inner markings; an irregular subterminal streak or spots whitish; cilia barred. Hindwings fuscous or dark fuscous; cilia barred.

Britain to the Shetlands, Ireland, common, more local southwards; N. and C. Europe; 6, 7. Larva slender, grey-whitish or ochreous-whitish; head in ♂ red-brown, in ♀ darker purple-brown; plate of 2 in ♂ red-brown, in ♀ pale brownish-orange; 3 and 4 with some pale brownish-orange plates: in rootstock of *Pteris aquilina;* 7-5, living two years.

4. **H. sylvinus**, *L.* 31-45 mm. Antennae in ♂ lamellate. Forewings deep ochreous, more or less crimson-tinged, in ♀ more suffused with fuscous, especially in disc; a whitish anteriorly fuscous-edged irregular streak from disc at $\frac{1}{6}$ to middle of dorsum, and a straight postmedian streak not reaching margins; an indistinct fuscous discal spot and subterminal shade. Hindwings dark fuscous, towards apex more or less reddish-tinged.

Britain to Ross, Ireland, rather common; N. and C. Europe, Asia Minor; 6-9. Larva shining whitish; head orange-brown; plate of 2, and some marks on 3 and 4 brownish-orange: on roots of *Rumex*, *Taraxacum*, etc.; 9-7.

5. **H. humuli**, *L.* 44-64 mm. Antennae in ♂ simple. Posterior tibiae in ♂ with dense tuft of hairs. Forewings in ♂ with termen sinuate, silvery-white, costal edge reddish-fuscous; in ♀ pale yellow-ochreous, with some ill-defined anterior spots and two posterior irregular lines from costa not reaching dorsum brown-reddish. Hindwings in ♂ as forewings, in ♀ light ochreous-grey, faintly reddish-tinged. In a variable local form occurring in the Shetland Isles and occasionally southwards to Lanark, the ♂ varies into the colour and markings of the ♀ and is sometimes much suffused with brown, the hindwings sometimes dark fuscous, the ♀ varies in colour from whitish to orange-brown.

Britain to Shetlands, Ireland, common; N. and C. Europe, Asia Minor; 6, 7. Larva whitish; head and plate of 2 red-brown: on roots of grasses, *Rumex*, *Lamium*, *Urtica*, etc.; 8-5. The ♂ attracts the ♀, as in *H. hectus;* its white colour doubtless assists this process in the twilight.

2. MICROPTERYGIDAE.

Head rough. Ocelli present. Maxillary palpi long, several-jointed, folded. Forewings: 1b furcate, sometimes connected by bar with dorsum, 1c connected with cell by bar near base, forked parting-vein strong, rising from lower cell-margin near base, secondary cell well-marked, 12 connected with cell by bar near base.

This family has not been satisfactorily identified elsewhere than in the European region, N. and S. America, and New Zealand; but the inconspicuous character of the imagos, which are in some instances almost invisible on the wing, renders them peculiarly liable to be overlooked. The species are all small, and fly in the sunshine; the forewings are ovate-lanceolate with bronzy-golden and purple colouring, often with a pale dorsal praetornal spot or transverse fasciae.

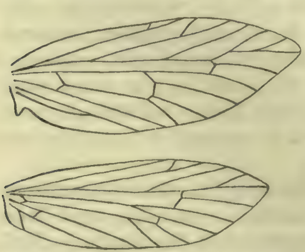
The New Zealand genus *Palaeomicra* is the most ancient known. It differs from *Eriocephala* in still retaining the following ancestral characters, viz. the trifurcation of 1b (in one species), the subbasal bar between the parting-vein and upper cell-margin, the additional vein rising out of 11, and (in one species) a second additional vein rising out of 12 near base. The possession of these structures causes the neuration of *Palaeomicra* to be practically identical with that of *Rhyacophila*, a genus of *Trichoptera* (caddis-flies); the only important difference is that in *Rhyacophila* there is an additional vein rising out of 4 in the forewings, but it is interesting to observe that this very vein has disappeared in the hindwings. Nothing at all approaching this form of neuration is known in any other Order of insects, and it is highly improbable that so complex a type could have originated twice independently; there need be no hesitation, therefore, in concluding that the relationship (which is equally indicated in the mouth-parts and other structures) is real.

Tabulation of Genera.

Forewings with 7 and 8 separate .	2. ERIOCEPHALA.
,, with 7 and 8 stalked .	1. MICROPTERYX.

1. MICROPTERYX, *Hb.*

No mandibles. Tongue short. Labial palpi moderate, porrected, hairy beneath. Posterior tibiae thinly hairy above. Forewings: 7 and 8 stalked, 7 to apex, 9 sometimes absent, 11 and 12 sometimes with additional branches (*subpurpurella*). Hindwings as forewings, but 9 and additional branches of 12 always absent.



Neuration of *Micropteryx subpurpurella.*

As now restricted, the genus is confined to N. and C. Europe, and includes only one or two other species besides those here described; but probably more remain to be discovered, as few workers have given attention to the group. The species are mostly very similar in appearance and habit, and require care in discrimination. The abdomen in ♀ is furnished with a serrated lancet-like implement for egg-deposition. Ovum rounded-cylindrical, placed in a pocket cut within the substance of the leaf. Larva apodal, head small, 2-4 broad, with minute protrusible subdorsal and supraventral papillae, 5 with lateral projections, thence tapering posteriorly; mining blotches (originating as a gallery) in leaves of *Amentiferae*, excrement forming small filiform sections. Pupa subterranean.

1. Antennae $\frac{3}{5}$ . . . . . . 2.
,, $\frac{1}{2}$ or less . . . . 3.
2. Hindwings with hair-scales . 5. *semipurpurella*
,, with flat scales . 8. *subpurpurella.*
3. Dorsal spot of forewings white . 7. *unimaculella.*
,, ,, ,, pale golden . . 4.
4. Forewings rather short and broad . . 5.
,, elongate . . . . 6.
5. Forewings very sharply strigulated 1. *sparmannella.*
,, rather suffusedly strigulated and veined
2. *salopiella.*
6. Antennae $\frac{1}{2}$ . . . . . 7.
,, less than $\frac{1}{2}$ . . . 3. *purpurella.*
7. Dorsal spot distinct, reaching half across wing 6. *Sangii.*
,, ,, rather indistinct, not reaching half across wing . . 4. *Kaltenbachii*

1. **M. sparmannella**, *Bosc.* 9-11 mm. Head pale grey, somewhat mixed with dark fuscous. Antennae hardly $\frac{1}{2}$. Forewings rather short and broad, pale shining golden, strongly and sharply strigulated with purple; a narrow erect dorsal spot of ground-colour before tornus, reaching half across wing; cilia grey, sometimes obscurely barred with ochreous-whitish; 9 absent. Hindwings rather dark grey, towards apex purplish-tinged.

Britain to Sutherland, N. Ireland, local; N. and C. Europe; 5. Larva whitish; head brown, sides blackish; two marks on 2 outlined with brown: in blotch (rectangular when young) in leaves of birch; 6, 7.

2. **M. salopiella**, *Stt.* 9-11 mm. Head ochreous-grey-whitish, somewhat mixed with dark fuscous. Antennae about $\frac{1}{2}$. Forewings rather short and broad, pale shining golden, strigulated and sometimes partly suffused with purple, veins posteriorly purple; a well-marked subtriangular dorsal spot of ground-colour before tornus, reaching half across wing; an indistinct pale costal spot beyond this; cilia purplish-grey, on dorsal spot ochreous-whitish; 9 absent. Hindwings grey, posteriorly purplish-tinged.

England to Westmoreland, local; not recognised elsewhere; 4. Larva whitish; head pale brown; anterior edge of 2 brownish: in blotch (elongate-ovate when young) in leaves of birch; 5.

3. **M. purpurella**, *Hw.* (*caledoniella*, Griffith) 9-11 mm. Head fuscous, somewhat mixed with grey-whitish. Antennae

less than ½. Forewings rather elongate, pale shining golden, strigulated and spotted with purple, veins posteriorly purple; a rather indistinct transverse dorsal spot of ground-colour before tornus, not reaching half across wing; cilia light grey; 9 absent. Hindwings grey, towards apex purplish-tinged.

Britain to Sutherland, common; NC. Europe; 4. Larva whitish; head whitish, mouth pale brown; 6-11 with small projections: in blotch in leaves of birch; 5.

4. **M. Kaltenbachii**, *Stt.* 9-11 mm. Head fuscous, somewhat mixed with grey-whitish. Antennae ½. Forewings elongate, pale shining bronzy-golden, more or less suffusedly strigulated or sometimes almost wholly suffused with reddish-purple; a rather indistinct subtriangular dorsal spot of ground-colour before tornus, not reaching half across wing; cilia bronzy-grey; 9 absent. Hindwings grey, towards apex purplish-tinged.

S. England to Essex and Hereford, local; Belgium, Germany; 4. Larva whitish; head pale brown, mouth darker; two greyish-tinged marks on 2; 6-11 with minute projections: in blotch in leaves of hazel; 5.

5. **M. semipurpurella**, *Stph.* (*inconspicuella*, Wood) 10-15 mm. Head grey. Antennae ⅗. Forewings elongate, bronzy-purple, more or less sprinkled with pale shining golden; an indistinct usually small transverse pale golden dorsal spot before tornus, sometimes almost obsolete; cilia bronzy-grey, on dorsal spot ochreous-whitish; 9 absent. Hindwings with hair-scales except towards margins posteriorly, bronzy-grey, posteriorly purplish-tinged.

Britain to the Shetlands, E. Ireland, common; N. and C. Europe; 4. Larva whitish; head pale ochreous-brown, mouth darker: in blotch in leaves of birch; 5.

6. **M. Sangii**, *Wood.* 11-12 mm. Head whitish-grey-ochreous, more or less mixed with dark fuscous. Antennae ½. Forewings elongate, bronzy-purple, with more or less numerous pale shining golden irregular spots; a subtriangular pale golden dorsal spot before tornus, reaching half across wing; cilia bronzy-grey, on dorsal spot ochreous-whitish; 9 absent. Hindwings bronzy-grey, towards apex purplish-tinged.

S. England to Herts and Hereford, Durham (?), local; not recognised elsewhere; 4. Larva grey; head black, centre and mouth brown; 2 with two groups of black spots: in brownish blotch in leaves of birch; 5.

7. **M. unimaculella**, *Zett.* 9-11 mm. Head fuscous, mixed

with ochreous-whitish. Antennae $\frac{1}{2}$. Forewings elongate, bronzy-purple, more or less sprinkled with pale shining golden; a narrow slightly curved transverse white dorsal spot before tornus, reaching about half across wing; cilia grey; 9 present. Hindwings grey, posteriorly purplish-tinged.

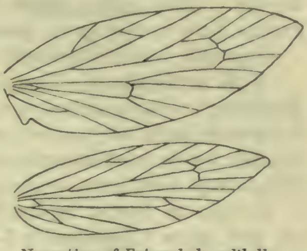
Britain to Caledonian Canal, E. Ireland, common; N. and C. Europe; 4. Larva whitish; head brown, mouth darker, posterior lobes showing through 2 as blackish spots; 6 with small projections: in blotch in leaves of birch; 5.

8. **M. subpurpurella**, *Hw.* (*fastuosella*, *Z.*) 11-14 mm. Head ochreous-grey-whitish mixed with dark fuscous. Antennae $\frac{3}{5}$. Forewings elongate, pale shining golden-bronzy, usually with a few (sometimes more numerous) scattered purple strigulae; an indistinct obscurely paler dorsal spot before tornus; cilia grey; 9 present. Hindwings brassy-grey, posteriorly purplish-tinged.

Britain to Caledonian Canal, E. Ireland, very common; C. and SE. Europe, Asia Minor; 5. Larva whitish; head pale brown: in blotch in leaves of oak; 6.

2. Eriocephala, *Curt.*

Mandibles developed. No tongue. Labial palpi obsolete. Posterior tibiae with spurs placed in groups of bristles. Forewings: 7 to costa, 11 connected by bar with 12, 12 giving rise to an additional vein (13) about middle. Hindwings as forewings, but 13 usually absent.



Neuration of *Eriocephala calthella.*

Includes about a score of species, inhabiting especially S. Europe, Asia Minor, Syria, and N. Africa. The imagos frequent blossoms (*Carex*, etc.), feeding on pollen. Ovum spherical, studded with minute erect rods. Larva stout, with legs on 2-4, hooked prolegs on 5-12; antennae well-developed, 4-jointed; 8 rows of subglobose tubercular processes, paired on 4 longitudinal ridges; a trilobed anal sucker beneath: feeding in wet moss. Pupa in cocoon of silk and refuse.

1. Head black . . . . . . 3. *mansuetella.*
 „ ferruginous . . . . . 2.
2. Forewings with transverse fasciae . . . 3.
 „ not fasciated . . . . . 5.

3. Markings of forewings white . 4. *aruncella* ♂.
,, ,, not white . . . . 4.
4. Forewings with termen bronzy-purple . 2. *aureatella.*
,, ,, pale golden . 1. *thunbergella.*
5. Forewings with base purple . . 5. *calthella.*
,, ,, base of costa only purple 4. *aruncella* ♀.

1. **E. thunbergella,** *F.* 8-9 mm. Head light ferruginous. Forewings pale shining bronzy-golden; a spot on costa near base, a fascia before middle not reaching dorsum, another beyond middle furcate towards costa, and a costal spot before apex sometimes connected with this beneath purplish-coppery. Hindwings rather dark bronzy-grey, posteriorly purplish-tinged.

England, in woods, common; C. Europe; 5.

2. **E. aureatella,** *Sc.* (*allionella,* F.) 8-9 mm. Head light ferruginous. Forewings shining bronzy-purple; a straight fascia towards base, a rather oblique somewhat bent median fascia, and a spot towards costa posteriorly pale shining golden. Hindwings bronzy-grey, posteriorly purplish-tinged.

Britain to Sutherland, Ireland, in woods, local; N. and C. Europe; 5, 6.

3. **E. mansuetella,** *Z.* 8-9 mm. Head black. Forewings pale shining bronzy-golden; a costal spot near base, a fascia before middle not reaching dorsum, and posterior half of wing deeper golden, often more or less purple-tinged. Hindwings rather dark bronzy-grey, posteriorly purplish-tinged.

England, local; Germany; 5, 6.

4. **E. aruncella,** *Sc.* (*seppella,* F.) 7-8 mm. Head ferruginous. Forewings shining bronzy-golden; base of costa purple; in ♂ a transverse mark at $\frac{1}{4}$ sometimes reaching costa, a straight slender median fascia, and sometimes a costal mark at $\frac{3}{4}$ shining white. Hindwings dark grey, posteriorly purplish-tinged.

Britain to Perth, Ireland, common; C. Europe; 6. Larva on wet moss (*Hypnum*); 7-10. The variety of the ♂ with a posterior costal mark has long been regarded as a distinct species, under the name of *seppella;* but the two forms are connected by gradual transitions.

5. **E. calthella,** *L.* 7-9 mm. Head deep ferruginous-yellow. Forewings pale shining bronzy-golden; base purple. Hindwings rather dark bronzy-grey.

Britain to Sutherland, N. and E. Ireland, very common; Europe (except SW.); 5, 6. Larva on wet moss (*Hypnum*); 7-10.

CENSUS OF SPECIES

CARADRININA.

Arctiadae	40	378
Caradrinidae	273	
Plusiadae	54	
Ocneriadae	11	

NOTODONTINA.

Hydriomenidae	146	326
Sterrhidae	36	
Geometridae	8	
Monocteniadae	5	
Selidosemidae	79	
Polyplocidae	9	
Sphingidae	17	
Notodontidae	25	
Saturniadae	1	

LASIOCAMPINA.

Drepanidae	6	18
Endromididae	1	
Lasiocampidae	11	

PAPILIONINA.

Nymphalidae	19	68
Satyridae	11	
Erycinidae	1	
Lycaenidae	18	
Pieridae	10	
Papilionidae	1	
Hesperiadae	8	

PYRALIDINA.

Phycitidae	45	187
Galleriadae	5	
Crambidae	32	
Pyraustidae	65	
Pyralididae	8	
Pterophoridae	31	
Orneodidae	1	

PSYCHINA.

Psychidae	3	16
Zeuzeridae	2	
Zygaenidae	9	
Heterogeneidae	2	

TORTRICINA.

Epiblemidae	201	330
Tortricidae	81	
Phaloniadae	47	
Trypanidae	1	

TINEINA.

Aegeriadae	14	720
Gelechiadae	132	
Oecophoridae	76	
Elachistidae	172	
Plutellidae	38	
Tineidae	288	

MICROPTERYGINA.

Hepialidae	5	18
Micropterygidae	13	

Total . 2061

APPENDIX

Classified List of the better-known Food-plants, with English Names

Cardamine pratensis	Cuckoo-flower.
Brassica	Cabbage, Turnip, etc.
Reseda	Wild Mignonette.
Helianthemum	Rock-cistus.
Viola	Violet.
Polygala	Milkwort.
Silene and *Lychnis*	Campion.
Cerastium	Mouse-ear Chickweed.
Stellaria media	Chickweed.
S. holostea	Stitchwort.
Hypericum	St. John's-wort.
Linum	Flax.
Malva	Mallow.
Althaea	Hollyhock.
Tilia	Lime.
Impatiens	Balsam.
Euonymus	Spindle-tree.
Rhamnus	Buckthorn.
Ulex	Furze, Gorse.
Genista tinctoria	Dyer's Greenweed.
Cytisus scoparius	Broom.
Ononis	Restharrow.
Trifolium	Clover.
Lotus	Birdsfoot Trefoil.
Anthyllis	Kidney Vetch.
Onobrychis	Sainfoin.
Vicia	Vetch.
Lathyrus macrorrhizus	Tuberous Pea.
Prunus cerasus, avium	Wild Cherry.
Rubus idaeus	Raspberry.
R. caesius, fruticosus	Bramble.
Fragaria	Strawberry.

Potentilla tormentilla	Tormentil.
Alchemilla	Lady's-mantle.
Poterium	Salad Burnet.
Rosa	Rose.
Pyrus aria	White Beam-tree.
P. torminalis	Wild Service-tree.
P. aucuparia	Mountain-ash.
Epilobium	Willow-herb.
Circaea	Enchanter's Nightshade.
Lythrum salicaria	Purple Loosestrife.
Bryonia	White Bryony.
Sedum acre	Stonecrop.
Ribes grossularia	Gooseberry.
R. nigrum, rubrum	Currant.
Saxifraga	Saxifrage.
Eryngium	Sea Holly.
Aegopodium	Goutweed.
Pimpinella	Burnet Saxifrage.
Peucedanum sativum	Wild Parsnip.
Heracleum	Cow Parsnip.
Daucus	Wild Carrot.
Hedera	Ivy.
Cornus	Dogwood.
Sambucus	Elder.
Viburnum lantana	Wayfaring-tree.
Lonicera	Honeysuckle.
Galium	Bedstraw.
Valeriana	Valerian.
Dipsacus	Teazel.
Scabiosa	Scabious.
Eupatorium	Hemp Agrimony.
Aster tripolium	Sea Aster.
Solidago	Goldenrod.
Gnaphalium	Cudweed.
Inula dysenterica	Fleabane.
Chrysanthemum leucanthemum	Oxeye Daisy.
Anthemis cotula	Stinking Mayweed.
Achillea millefolium	Yarrow.
Tanacetum	Tansy.
Artemisia vulgaris	Mugwort.
A. absinthium	Wormwood.
Tussilago farfara	Coltsfoot.
Petasites	Butterbur.
Senecio vulgaris	Groundsel.
S. jacobaea	Ragwort.

Arctium	Burdock.
Carduus	Thistle.
Carlina	Carline Thistle.
Centaurea	Knapweed.
Taraxacum	Dandelion.
Lactuca	Lettuce.
Sonchus	Sow-thistle.
Hieracium	Hawkweed.
Campanula trachelium	Nettle-leaved Campanula.
C. rotundifolia	Hairbell.
Vaccinium myrtillus	Bilberry.
V. vitis-idaea	Red Whortleberry.
Arctostaphylos	Bearberry.
Erica	Heath.
Calluna	Ling.
Primula vulgaris	Primrose.
P. veris	Cowslip.
Ligustrum	Privet.
Erythraea	Centaury.
Convolvulus	Bindweed.
Echium vulgare	Viper's Bugloss.
Lithospermum	Gromwell.
Symphytum	Comfrey.
Solanum dulcamara	Bittersweet.
Verbascum	Mullein.
Linaria vulgaris	Toadflax.
Scrophularia	Figwort.
Digitalis	Foxglove.
Rhinanthus	Yellow Rattle.
Melampyrum	Cow-wheat.
Mentha	Mint.
Thymus	Thyme.
Origanum	Marjoram.
Calamintha	Calamint.
Nepeta glechoma	Ground-ivy.
Prunella	Self-heal.
Stachys betonica	Betony.
S. sylvatica	Hedge Woundwort
Ballota	Black Horehound
Lamium	Dead-nettle.
Teucrium scorodonia	Wood-sage.
Ajuga	Bugle.
Statice limonium	Sea Lavender.
Plantago	Plantain.
Chenopodium	Goosefoot.

Atriplex	Orache.
Rumex	Dock.
R. acetosa, acetosella	Sorrel.
Polygonum aviculare	Knotgrass.
Euphorbia	Spurge.
Mercurialis	Dog's Mercury.
Empetrum	Crowberry.
Urtica	Nettle.
Parietaria	Pellitory.
Humulus	Hop.
Myrica	Sweet-gale.
Salix caprea, aurita	Sallow.
S. fragilis, alba, etc.	Willow.
S. viminalis	Osier.
S. repens	Dwarf Sallow.
Populus alba	White Poplar.
P. tremula	Aspen.
P. nigra	Black Poplar.
Pinus sylvestris	Scotch Fir.
P. abies	Spruce Fir.
Typha	Reed-mace.
Sparganium	Bur-reed.
Lemna	Duckweed.
Potamogeton	Pondweed.
Alisma plantago	Water Plantain.
Juncus	Rush.
Luzula	Wood-rush.
Eriophorum	Cotton-grass.
Carex	Sedge.
Dactylis	Cocksfoot-grass.
Phragmites	Reed.

INDEX OF NAMES

Names italicised are synonyms, or refer to species not included as British.

abbreviata, Stph., 194
abdominalis, Z., 765
abiegana, Dup., 485
abietaria, Hb., 261
abietella, F., 370
abjecta, Hb., 133
abrasana, Dup., 540
Abraxas, 267
abruptaria, Thnb., 267
abscissana, Dbld., 455
absinthiata, Cl., 187
absinthii, L., 47
Acalla, 519
acanthodactyla, Hb., 433
Acanthophila, 583
Acentropus, 400
aceriana, Dup., 482
acerifoliella, Z., 737
aceris, L., 142
acetosae, Stt., 718
achatana, F., 484
achatinella, Hb., 378
Acherontia, 299
acis, Schiff., 345
Acompsia, 633
Acosmetia, 114
Acrobasis, 381
Acroclita, 504
Acrolepia, 771
Acronycta, 139
actaeon, Esp., 359
Actinotia, 125
acuminatana, Z., 502
acuminatella, Sirc., 590
adaequata, Bkh., 218
Adela, 793
adelphella, F.R., 366
adippe, L., 329
adippellus, Tr., 390
adjunctana, Tr., 538
adjunctella, Hodgk., 660
adonis, Hb., 348
adornatella, Tr., 364
adscitella, Stt., 671
adusta, Esp., 130
adustata, Schiff., 268
advena, F., 85
advenaria, Hb., 284
advenella, Zk., 380
Aegeria, 563
aegeria, L., 337
AEGERIADAE, 562
aegon, Schiff., 348
aemulana, Schl., 487
aenea, Hb., 166
aeneana, Hb., 558
aeneofasciella, HS., 717
aerariella, Stt., 765
aeratellum, Z., 684
aescularia, Schiff., 252
aesculi, L., 446
Aethia, 147
aethiops, Esp., 340
aethiops, Westw., 583
affinis, Dgl., 589
affinis, L., 117
affinitana, Dgl., 548
affinitata, Stph., 219
agathina, Dup., 95
Agdistis, 441
agestis, Hb., 346
aglaia, L., 329
Aglossa, 428
agrammella, Wood, 660

agrimoniella, HS., 722
Agrotera, 406
Agrotis, 88
ahenella, Hb., 369
ahenella, Hein., 646
airae, Stt., 669
alacella, Dup., 583
albersana, Hb., 517
albicans, HS., 658
albicapitana, Cooke, 553
albiceps, Z., 578
albicillata, L., 217
albicollis, F., 165
albicolon, Hb., 87
albicosta, Hw., 654
albifrontella, Hb., 667
albimacula, Bkh., 77
albimaculea, Hw., 636
albipalpella, HS., 582
albipuncta, F., 68
albipunctata, Hw., 188
albipunctella, Hb., 628
albipunctella, Hw., 790
albistria, Hw., 766
albistrigalis, Hw., 150
albitarsella, Z., 646
albovenosa, Gz., 144
albula, Hb., 34
albulata, Schiff., 220
alchemillata, L., 219
alchimiella, Sc., 751
alchymista, Schiff., 160
alcyonipennella, Koll., 646
alcella, F., 584
alexis, Hb., 349
algae, F., 138
Alispa, 367
allantiformis, Wd., 565
allionella, F., 806
allisella, Stt., 618
alnetella, Stt., 719
alni, L., 140
alniaria, Esp., 286
alniaria, L., 286
alniella, Z., 738
alnifoliella, Dup., 738
alpella, Schiff., 700
alpestrana, HS., 500
alpina, Stt., 421
alpina, Stt., 107
alpinalis, Schiff., 414
alpinana, Stt., 501
alpinana, Tr., 501
alpinella, Hb., 396
alpinella, Stt., 668
alsines, Brh., 122
alstroemeriana, Cl., 62
alsus, F., 345
alternana, Stph., 558
alternana, Wilk., 467
alternaria, Hb., 257
alternella, Wilk., 539
alticolella, Z., 659
Alucita, 438
alvearia, F., 384
alveolus, Hb., 356
alveus, Hb., 356
amandana, HS., 555
amata, L., 246
amataria, L., 246
ambigua, F., 123
ambigualis, Tr., 423
ambiguella, Hb., 556
amoenana, Hb., 489
Amphipyra, 114
Amphisbatis, 638
amyotella, Dup., 737
Anacampsis, 581
anachoreta, Hb., 302
Anarsia, 609
anatipennella, Hb., 651
anceps, Hb., 133
ancilla, L., 23
Ancylis, 477
andereggiella, Dup., 763
anderidae, Fletcher, 739
andreniforme, Lasp., 565
anellus, Schiff., 385
Anerastia, 363
angelicella, Hb., 625
anglicella, Stt., 748
anguinalis, Hb., 413
angularia, Bkh., 286
angularia, Thnb., 264
angulifasciella, Stt., 722
angustalis, Schiff., 429
angustana, Tr., 557
angustea, Stph., 421
angustella, Hb., 367
angusticollella, Z., 760
angustiorana, Hw., 528
angustipennis, HS., 790
anicanella, Brd., 774
Anisotaenia, 556
annulata, Schulze, 246
annulatella, Curt., 702

annulatella, Tgst., 657
anomala, Hw., 125
anomalella, Gz., 715
Anosia, 327
anthemidana, Wilk., 551
anthyllidella, Hb., 582
Antigastra, 405
antiopa, L., 333
antiqua, L., 172
antiquana, Hb., 469
Antispila, 683
Anybia, 675
Apatura, 335
Aphanaula, 579
Aphomia, 385
apicella, Don., 769
apicella, Stt., 655, 726
apiciaria, Schiff., 282
apicipunctella, Stt., 667
apiformis, Cl., 563
Aplasta, 251
Aplota, 614
Apocheima, 276
Apoda, 451
apollo, L., 355
Aporia, 354
Aporophyla, 57
applana, F., 626
aprilina, L., 53
aquilina, Hb., 96
arbutella, L., 465
arbuti, F., 167
arcella, F., 788
arceuthata, Frr., 196
arceuthina, Z., 763
archippus, F., 328
Arctia, 41
ARCTIADAE, 23
arcuatella, HS., 723
arcuatella, Stt., 789
arcuella, Cl., 465
arcuosa, Hw., 121
arcuosella, Dbld., 723
ardeaepennella, Scott, 652
arenella, Schiff., 622
areola, Esp., 52
argentana, Cl., 542
argentella, Cl., 674
argentimaculella, Stt., 792
argentipedella, Z., 721
argentula, Hb., 166
argentula, Z., 657
argiades, Pall., 345
argiolus, L., 347
Argynnis, 328
argyrana, Hb., 507
Argyresthia, 761
argyropeza, Z., 726
aridella, Hein., 669
aridus, Z., 441
arion, L., 349
Aristotelia, 572
armigera, Hb., 108
Arsilonche, 144
artaxerxes, F., 346
artemis, Hb., 331
artemisiae, HS., 731
artemisiae, Hufn., 47
artemisicolella, Brd., 658
artemisiella, Scott, 658
artemisiella, Stt., 375
artemisiella, Tr., 591
aruncella, Sc., 806
arundineta, Schm., 110
arundinetella, Stt., 576
arundinis, F., 111
arundinis, Hb., 445
asella, Schiff., 451
Ashworthii, Dbld., 97
asiliforme, Rott., 565
asinalis, Hb., 417
asperella, L., 699
aspersana, Hb., 526
aspidiscana, Hb., 487
assimilata, Gn., 187
assimilella, Tr., 621
assimilella, Z., 725
assimilis, Dbld., 123
associata, Bkh., 204
asteris, Schiff., 48
Asteroscopus, 56
Asthena, 224
Asthenia, 472
astrarche, Bgstr., 346
Asychna, 660
atalanta, L., 334
Atemelia, 694
athalia, Rott., 331
atomalis, Dbld., 423
atomarius, L., 265
atomella, Hb., 621
atra, Hw., 678
atrata, L., 251
atrella, Hw., 575
atricapitana, Stph., 552
atricapitella, Hw., 714

atricollis, Stt., 722
atricomella, Stt., 668
atrifrontella, Stt., 727
atriplicella, F.R., 591
atriplicis, L., 128
atropos, L., 299
aucupariae, Fr., 715
audouinana, Dup., 536
Augasma, 684
augur, F., 96
augustana, Hb., 473
augustella, Hb., 636
aurago, F., 61
aurana, F., 517
aurantiaria, Esp., 275
aurata, Sc., 414
aureatella, Sc., 806
aurella, Stt., 717
aureola, Hb., 28
auricoma, F., 143
auriflua, F., 174
aurifrontella, Hb., 677
aurimaculella, Stt., 730
aurinia, Rott., 331
auritella, Hb., 729
auroguttella, Stph., 753
auroguttella, Stt., 640
auromaculata, Fr. 689
auromarginella, Rich., 717
auroraria, Bkh., 235
aurulentella, Stt., 764
australis, B., 58
autumnana, Hb., 522
autumnaria, Gn., 224
autumnaria, Wernb., 286
autumnitella, Curt., 772
avellanella, Hb., 616
avellanella, Stt., 748
Aventia, 152
aversata, L., 238

Bactra, 456
badiana, Hb., 548
badiata, Hb., 215
badiella, Hb., 627
badiipennella, Dup., 649
baetica, L., 347
baja, F., 106
bajularia, Schiff., 248
baliodactylus, Z., 436
bankesiella, Rich., 368
bankiana, F., 166
Baptria, 251
barbalis, Cl., 149
Barrettii, Dbld., 78
basaltinella, Z., 588
basiguttella, Hein., 715
basilinea, F., 133
basistrigalis, Knaggs, 423
batis, L., 289
Batrachedra, 661
baumanniana, Schiff., 554
bedellella, Sirc., 670
Bedellia, 758
belgaria, Hb., 272
bella, Bkh., 102
bellana, Curt., 540
bellargus, Rott., 348
bembeciformis, Hb., 563
Bennetii, Curt., 441
berberata, Schiff., 216
bergmanniana, L., 536
Bertrami, Rsl., 434
betulae, Gz., 366
betulae, L., 343
betulae, Stt., 683, 747
betulae, Z., 744
betuletana, Hw., 461
betularius, L., 278
betulella, Curt., 771
betulicola, Stt., 720
betulina, Z., 774
biarcuana, Stph., 480
biatomella, Stt.. 672
bicolorana, Fuesl., 36
bicolorata, Hufn., 205
bicolorella, Stt., 648
bicoloria, Schiff., 310
bicoloria, Vill., 136
bicostella. Cl., 614
bicuspis, Bkh., 312
bidentata, Cl., 287
bifasciana, Hb., 536
bifasciana, Hw., 468
bifida, Hb., 311
bifractella, Dgl., 575
bilineata, L., 220
bilunana, Hw., 497
bilunaria, Esp., 282
bimaculana, Don., 495
bimaculata, F., 270
bimaculata, Stph., 158
bimaculella, Hw., 677
bimaculosa, L., 56
binaevella, Hb., 377
binaria, Hufn., 317

binotapennella, *Stt.*, 650
bipunctanus, Z., 385
bipunctaria, Schiff., 228
bipunctella, F., 631
bipunctidactyla, Hw., 441
bipunctosa, *Stt.*, 621
birdella, Curt., 778
biriviata, *Stt.*, 206
biselliella, Hüm., 782
bisetata, Hufn., 240
bisontella, Z., 778
Biston, 277
bistriga, Hw., 381
bistrigella, Hw., 783
biundularia, Bkh., 260
bjerkandrella, Thnb., 706
blanda, *Tr.*, 123
blandiata, *Hb.*, 218
blandina, *F.*, 340
blandulella, Tutt, 594
Blomeri, Curt., 223
boisduvaliella, Gn., 368
boleti, F., 779
Boletobia, 146
bombyliformis, Esp., 293
Bomolocha, 150
Bondii, *Knaggs*, 121
boreata, Hb., 222
boreella, Dgl., 602
boscana, F., 523
bouchardana, *Dbld.*, 473
boyerella, Dup., 731
Brachmia, 605
brachydactylus, Tr., 437
bractea, F., 157
bractella, L., 632
branderiana, L., 468
brassicae, L., 86, 354
bremiella, *Fr.*, 738
Brephos, 253
brevilinea, Fenn., 120
brizella, Tr., 575
brockeella, Hb., 763
brongniardellum, F., 749
brumata, L., 222
brunnea, F., 101
brunneata, Thnb., 258
brunnichiana, Fröl., 496
brunnichiella, L., 674
Bucculatrix, 729
bucephala, L., 312
buoliana, Schiff., 470
Bupalus, 265
Cacoecia, 529
cacuminatella, *Dbld.*, 655
caecana, Schl., 514
caecimaculana, Hb., 498
caeruleocephala, L., 56
caesia, Bkh., 78
caesiata, Lang., 215
caesiella, Hb., 769
caespititiella, Z., 659
cahiritella, Z., 373
caja, L., 42
Calamotropha, 387
c-album, L., 332
caledoniana, Stph., 526
caledoniella, *Griffith*, 803
caledoniella, *Stt.*, 744
calidella, Gn., 373
caliginosa, Hb., 114
caliginosana, *Tr.*, 502
Callimorpha, 42
callunae, *Palmer*, 320
Calocalpe, 201
Calothysanis, 246
calthella, L., 806
calvella, *O.*, 444
cambrica, Curt., 225
camelina, L., 309
campanulata, HS., 187
campoliliana, *Tr.*, 492
cana, Hw., 499
canariella, *Stt.*, 781
cancellana, *Z.*, 548
candelarum, *Stgr.*, 97
candidata, Schiff., 224
candidulana, Nolck., 486
canella, Hb., 364
caniola, Hb., 28
cannae, O., 111
cantiellus, *Tutt*, 395
capitella, Cl., 787
capreana, Hb., 461
capreolella, Z., 625
caprimulgella, HS., 790
capsincola, Hb., 79
capsophila, *Dup.*, 78
captiuncula, Tr., 136
Capua, 527
Caradrina, 115
CARADRINIDAE, 43
Caradrinides, 88
CARADRININA, 22
carbonana, Barr., 464
carbonarius, Cl., 266

carbonariella, F.R., 366
Carcina, 613
cardamines, L., 352
carduana, Z., 553
carduella, Hb., 623
cardui, L., 334
carlinella, Stt., 571
carmelita, Esp., 310
carnella, L., 366
carnica, Hering, 107
carpinata, Bkh., 180
carpinetella, Stt., 788
carpini, Schiff., 313
carpinicolella, Stt., 742
Carpocapsa, 515
carpophaga, Bkh., 78
Carsia, 200
cassentiniellus, Z., 392
cassinea, Hb., 57
cassiope, F., 340
castanea, Esp., 102
castaneae, Hb., 445
castanella, Edleston, 722
castigata, Hb., 190
castrensis, L., 322
Cataclysme, 207
Cataclysta, 402
catalaunalis, Dup., 405
Cataplectica, 689
Catephia, 160
Cateremna, 375
catharticella, Stt., 724
Catocala, 161
cauchyata, Dup., 191
caudana, F., 519
caudella, L., 698
cautella, Z., 599
cavella, Z., 740
Cedestis, 760
celerella, Stt., 601
celerio, L., 296
cembrae, Hw., 423
centaureata, F., 189
centifoliella, Z., 719
centonalis, Hb., 32
cephalonica, Stt., 384
Cepphis, 284
cerago, F., 61
cerasana, Hb., 533
cerasicolella, HS., 741
ceratoniae, Z., 379
cerealella, Ol., 571
cereana, L., 386
Cerostoma, 697
certata, Hb., 201
Cerura, 310
cerusella, Hb., 672
cerussella, Schiff., 396
cervinata, Schiff., 227
cespitalis, Schiff., 414
cespitana, Hb., 468
cespitis, F., 81
chaerophyllata, L., 251
chaerophyllella, Gz., 691
chaerophylli, Z., 628
chalcites, Esp., 158
chalcogrammella, Z., 651
chamomillae, Schiff., 48
chaonia, Hb., 306
Charaeas, 75
Cheimatophila, 543
Cheimophila, 615
Chelaria, 610
chenopodiella, Hb., 687
chenopodii, F., 82
chi, L., 54
Chilo, 397
Chimabache, 615
Chlidonia, 554
Chloroclystis, 182
choragellus, Z., 779
Choreutis, 705
christiernana, L., 613
Chrosis, 455
chrysanthemana, Dup., 539
chryseis, Bkh., 344
chrysidiforme, Esp., 567
chrysitis, L., 156
Chrysoclista, 676
chryson, Esp., 157
chrysonuchellus, Sc., 392
Chrysophanus, 344
chrysorrhoea, L., 174
chrysozona, Bkh., 81
cicadella, Z., 688
cicatricellus, Hb., 397
cidarella, Z., 732
cilialis, Hb., 408
ciliella, Hb., 551
ciliella, Stt., 626
Cilix, 315
cinctalis, Tr., 418
cinctana, Schiff., 539
cinctaria, Schiff., 264
cinctella, Z., 671
cincticulella, HS., 582

cinerana, Hw., 493
cineraria, Hb., 266
cinerea, Hb., 94
cinerella, Cl., 607
cinereopunctella, Hw., 667
cinerosella, Z., 375
cingillella, HS., 671
cingulata, L., 413
ciniflonella, Z., 624
cinnamomeana, Tr., 534
cinxia, L., 331
circellaris, Hufn., 62
circellata, Gn., 236
cirrigerella, Zk., 379
cirsiana, Z., 495
citrago, L., 60
citrana, Hb., 486
citraria, Hb., 273
citrinalis, Sc., 613
citrinellum, Z., 749
cladiella, Stt., 704
clathrata, L., 257
Cleora, 262
clerkella, L., 757
Clisiocampa, 322
cloacella, Hw., 789
clorana, L., 35
Clysia, 556
cnicana, Dbld., 548
cnicella, Tr., 623
c-nigrum, L., 99
coarctata, Z., 421
cochylidella, Stt., 790
Coenobia, 112
Coenonympha, 340
coenosa, Hb., 171
cognatana, Barr., 513
cognatellus, Hb., 696
Coleophora, 641
Colias, 350
collitella, Dup., 673
collitella, Stt., 673
Collix, 199
Colobochyla, 152
Colocasia, 173
colonella, L., 385
Colotois, 284
colquhounana, Barr., 541
comariana, Z., 524
combinella, Hb., 769
comes, Hb., 100
comitata, L., 221
comma, L., 69, 359
Commophila, 555
communana, HS., 541
comparana, Hb., 524
comparella, Z., 746
complana, L., 27
complanella, Hb., 759
complanula, B., 27
compositella, F., 512
compta, F., 77
comptana, Fröl., 479
comptella, Hb., 769
conchana, Hb., 466
concolor, Gn., 121
confinis, Stt., 589
conflua, Tr., 103
conformis, F., 52
confusalis, HS., 33
confusella, HS., 790
confusella, Wlsm., 724
congelatella, Cl., 543
coniferana, Rtz., 514
coniferata, Stt., 210
conigera, F., 69
Conistra, 65
conjugella, Z., 765
conjunctaria, Ld., 221
connexa, Bkh., 134
conscriptella, Hb., 610
consequana, HS., 504
consignata, Bkh., 195
consociella, Hb., 381
consonaria, Hb., 261
consortana, Wilk., 502
consortaria, F., 259
consortella, Stt., 670
conspersa, Esp., 77
conspersana, Dgl., 541
conspicillaris, L., 83
conspicualis, Hodgk., 423
conspicuata, Schiff., 266
conspicuella, Z., 652
conspurcatella, Z., 775
constrictata, Gn., 193
contaminana, Hb., 525
contaminellus, Hb., 395
conterminana, HS., 487
conterminella, Z., 624
contigua, Vill., 83
contiguaria, Hb., 235
continuella, Stt., 719
conturbatella, Hb., 680
convolvuli, L., 298
conwayana, F., 536

conyzae, Z., 655
coracina, Esp., 274
Corcyra, 384
cordigera, Thnb., 87
Coriscium, 748
cornella, F., 764
corollana, Hb., 511
coronata, Hb., 182
coronillella, Tr., 582
corticana, Hb., 461, 475
corticea, Hb., 91
corticella, Curt., 788
corydon, Pod., 348
corylana, F., 533
corylata, Thnb., 214
coryli, L., 173
coryli, Nic., 742
corylifoliella, Hw., 744
Coscinia, 38
cosmodactyla, Hb., 433
cosmophorana, Tr., 513
Cosmopteryx, 662
cossus, L., 560
costalis, F., 427
costana, F., 531
costella, F., 700
costella, Westw., 595
costipunctana, Hw., 495
costistrigalis, Stph., 150
costosa, Hw., 620
crabroniformis, Lew., 563
craccae, F., 154
CRAMBIDAE, 386
Crambus, 388
cramerella, F., 737
crassalis, F., 151
crassicornis, Hw., 119
crassiorella, Brd., 773
crataegana, Hb., 530
crataegata, L., 258
crataegella, Hb., 422
crataegella, L., 779
crataegi, L., 322, 354
crataegi, Z., 732
crataegifoliella, Dup., 732
craterellus, Sc., 392
crenana, Hb., 493
crenata, Esp., 307
crepuscularia, Hb., 260
crepusculella, Z., 729
cretacella, Rsl., 377
cribralis, Hb., 148
cribrella, Hb., 379
cribrum, L., 38
cristana, F., 521
cristatella, Z., 730
cristulalis, Dup., 33
croceago, F., 60
crocealis, Hb., 408
Crocota, 272
croesella, Sc., 795
cruciana, L., 473
cruciferarum, Z., 702
cruda, Tr., 74
cryptella, Stt., 726
Cryptoblabes, 380
cubicularis, Bkh., 122
cucubali, Fuesl., 79
cuculata, Hufn., 217
cuculipennellum, Hb., 749
cuculla, Esp., 309
cucullatella, L., 33
Cucullia, 46
cucullina, Hb., 309
culiciforme, L., 566
culmellus, L., 391
cultraria, F., 318
cuneatella, Dgl., 599
cuprealis, Hb., 428
cuprella, Thnb., 795
cupriacellus, Hb., 796
currucipennella, Z., 652
cursoria, Hufn., 94
curtisellus, Don., 694
curtula, L., 303
curvella, Stt., 764
curvistrigana, Wilk., 553
Curzoni, Gregs., 189
Cybosia, 29
Cyclopaedes, 357
Cydia, 482
cygnipennella, Hb., 674
Cynaeda, 419
cynipiformis, Esp., 565
cynosbatella, Wilk., 462
cytherea, F., 124
cytisaria, Schiff., 250
cytisella, Curt., 572

dahlii, Hb., 103
daleana, Dbld., 467
dalella, Stt., 702
daplidice, L., 353
Dasychira, 172
Dasypolia, 54
daucella, Pey., 692

davisellus, Newm., 371
davus, F., 341
dealbana, Fröl., 481
dealbata, L., 272
deauratella, Z., 646
debiliata, Hb., 183
decemguttella, Hb., 631
decimella, Stt., 765
decolorata, Hb., 219
decorella, Stph., 681
decrepitalis, HS., 415
decretana, Tr., 530
decuriella, Hb., 370
defoliaria, Cl., 275
degeerella, L., 795
degeneraria, Hb., 238
degreyana, McL., 551
Deilephila, 294
Deileptenia, 261
Deilinia, 278
delius, Esp., 355
demarniana, F.R., 493
demaryella, Stt., 733
denotata, Gn., 188
dentalis, Schiff., 419
dentella, Z., 690
dentina, Esp., 82
deplana, Esp., 27
Depressaria, 618
depressella, Hb., 629
depuncta, L., 104
derasa, L., 289
derasana, Hb., 478
derivalis, Hb., 148
derivata, Bkh., 216
desertella, Dgl., 590
designata, Rott., 229
despecta, Tr., 112
desperatella, Fr., 716
desuetella, Walk., 373
devoniella, Stt., 748
dia, L., 330
Diacrisia, 39
Diasemia, 404
Diastictis, 258
dichrodactylus, Mühl., 435
dictaea, Esp., 305
dictaeoides, Esp., 305
didyma, Esp., 135
didymata, L., 228
diffinis, Hw., 601
diffinis, L., 117
dilectella, Z., 763
Dilina, 300
Diloba, 56
dilucidana, Stph., 545
diluta, F., 291
dilutaria, Hb., 237
dilutata, Bkh., 224
dilutella, Hb., 364
dimidiana, Sodof., 464
dimidiata, Hufn., 239
diminutana, Hw., 480
Dioryctria, 369
Diplodoma, 776
dipoltella, Hb., 547
dipsacea, L., 109
discipunctella, HS., 630
discordella, Z., 654
disertella, HS., 673
dispar, Hw., 346
dispar, L., 175
dispunctella, Dup., 673
dissimilis, Kn., 84
dissoluta, Tr., 110
distans, Z., 431
distentella, Z., 742
distinctana, Barr., 502
distinctana, Wilk., 494
distinctella, Z., 601
distinguenda, Hein., 720
ditrapezium, Bkh., 99
diversa, Glitz, 723
diversana, Hb., 538
divisella, Dgl., 577
dodecella, L., 598
dodonaea, Hb., 306
dodonaea, Heyd., 759
dodoneata, Gn., 194
dolabraria, L., 281
domestica, Hw., 588
dominula, L., 43
Donacaula, 401
donelana, Carpenter, 537
dorsana, F., 512
dotata, Gn., 204
dotata, L., 211
doubledayana, Barr., 468
douglasella, Stt., 627
Douglasia, 684
Douglasii, Stt., 775
Drepana, 317
DREPANIDAE, 314
dromedarius, L., 304
drurella, Stt., 663
druryella, Z., 663

Drymonia, 305
dubiella, Stt., 791
dubitalis, Hb., 423
dubitana, Hb., 553
dubitata, L., 215
dubrisana, Curt., 547
dulcella, Hein., 717
Dumerilii, Dup., 113
dumetana, Tr., 538
dumetellus, Hb., 391
dunningiella, Stt., 744
duplana, Hb., 471
duplaris, L., 290
durdhamellus, Stt., 609
dysodea, Hb., 81

Earias, 35
echii, Bkh., 78
Ectropis, 259
edusa, F., 351
egenaria, HS., 196
Eidophasia, 703
Elachista, 664
ELACHISTIDAE, 638
electa, Bkh., 163
eleochariella, Stt., 672
elinguaria, L., 287
elongella, Hein., 577
elongella, L., 752
elpenor, L., 295
elutata, Hb., 212
elutella, Hb., 373
eluviella, Dbld., 377
elymi, Tr., 120
emarginata, L., 239
emberizipennella, Bch. 745
emeritella, Stt., 627
Emmelia, 167
emortualis, Schiff., 147
emortuella, Z., 788
empyrea, Hb., 128
emutaria, Hb., 242
emyella, Dup., 759
Enarmonia, 472
Endotricha, 426
ENDROMIDIDAE, 318
Endromis, 319
Endrosis, 688
Enicostoma, 617
Ennomos, 285
Eois, 234
Epagoge, 527
epelydella, Z., 380
Epermenia, 691
Ephestia, 372
ephippana, Hb., 508
ephippella, F., 766
Epiblema, 490
EPIBLEMIDAE, 453
Epichnopteryx, 772
epilobiella, Röm., 675
epilobiella, Schrk., 681
Epinephele, 338
Epinotia, 516
epiphron, Kn., 340
Epischnia, 368
Epithectis, 580
equitella, Sc., 705
Erannis, 252
Erastria, 164
Erebia, 339
erectana, Barr., 511
ericellus, Hb., 390
ericetana, Westw., 469
ericetaria, Vill., 263
ericetata, Stph., 218
ericetella, Hb., 603
ericinella, Dup., 574
erigerana, Wlsm., 552
Eriocephala, 805
Eriogaster, 321
eriosoma, Dbld., 158
erippus, Cr., 328
erosaria, Bkh., 285
erxlebella, F., 771
ERYCINIDAE, 341
erythrocephala, F., 65
Eublemma, 168
Eucestia, 199
Euchlaena, 281
Euchloe, 351
Euchloris, 248
Euchoeca, 223
Euchromius, 396
Euclidia, 163
Eucosma, 457
Eucymatoge, 197
Eudemis, 476
euphorbiae, F., 143
euphorbiae, L., 297
euphorbiana, Fr., 456
euphorbiata, F., 224
euphrosyne, L., 330
Eupoecilia, 554
Euproctis, 174
Eurhodope, 379

Eurrhypara, 407
Eustroma, 203
Eustrotia, 165
Euxanthis, 557
Euzophera, 374
Evergestis, 424
Evetria, 470
evonymella, Sc., 696
evonymellus, L., 695
Exaeretia, 617
exanthemata, Sc., 279
Exapate, 542
Exartema, 457
exclamationis, L., 92
exigua, Hb., 113
exiguata, Hb., 194
eximia Hw., 663
exoleta, L., 50
expallidana, Hw., 498
expallidata, Gn., 186
expolita, Stt., 136
expolitella, Dbld., 590
extensaria, Frr., 197
extersaria, Hb., 260
extimalis, Sc., 424
extranea, Gn., 70
extrema, Hb., 121
exulans, Hoch., 448
exulis, Lef., 123

fabriciana, L., 707
fabriciella, Vill., 645
fagella, F., 616
fagi, L., 307
faginella, Z., 741
fagivora, Stt., 748
Falcaria, 316
falcataria, L., 316
falconipennella, Hb., 751
falcula, Schiff., 316
falsellus, Schiff., 392
farinalis, L., 427
farinatella, Dup., 760
farrella, Curt., 368
Farreni, Wlsm., 689
fascelina, L., 172
fascelinellus, Hb., 394
fasciana, L., 164
fasciapennella, Stt., 767
fasciaria, Schiff., 280
fasciellus, F., 797
fasciellus, Hb., 609
fasciuncula, Hw., 137
fastuosella, Z., 805
favillaceana, Hb., 528
favillaceana, Hb., 522
fenestratella, Heyd., 784
fenestrella, Stt., 688
fennica, Tausch., 99
ferrugalis, Hb., 409
ferrugana, Tr., 525
ferrugaria, Hw., 229
ferrugata, L., 229
ferruginea, Esp., 62
ferruginella, Hb., 784
festaliella, Hb., 690
festiva, Hb., 103
festucae, L., 157
fibrosa, Hb., 134
fibulella, Schiff., 794
ficella, Dgl., 373
ficulella, Barr., 373
figulella, Stgr., 590
filigrammaria, HS., 224
filipendulae, L., 447
filipendulae, Wk., 718
fimbria, L., 105
fimbrialis, Schiff., 427
fimbriana, Hw., 507
finitimana, Dbld., 495
firmata, Hb., 230
fischeriella, Z., 705
fissipuncta, Hw., 64
flammatra, F., 99
flammea, Curt., 66
flammea, Esp., 128
flammealis, Schiff., 426
flammeana, Hb., 466
flavaginella, Z., 658
flavago, Esp., 110
flavago, F., 61
flavalis, Schiff., 415
flavella, Hb., 621
flavescentella, Hw., 791
flavicaput, Hw., 677
flaviciliana, Wilk., 552
flavicincta, F., 54
flavicinctata, Hb., 215
flavicomella, Stt., 668
flavicornis, L., 291
flavidorsana, Knaggs, 501
flavifrontella, Hb., 637
flavifrontella, Hein., 781
flavimaculella, Stt., 689
flexana, Z., 506
flexula, Schiff., 153

floslactella, Hw., 723
fluctuata, L., 231
fluctuosa, Hb., 290
fluviata, Hb., 220
foenella, L., 496
fontis, Thnb., 151
forficalis, L., 425
forficellus, Thnb., 401
formiciforme, Esp., 566
formosa, Hw., 366
formosella, F., 635
forskaleana, L., 536
forsterana, F., 538
forsterella, F., 704
fractifasciana, Hw., 485
fragariae, Stt., 748
fragariella, Heyd., 717
francillana, F., 545
frangulella, Gz., 731
fraternana, Hw., 494
fraternella, Dgl., 594
fraxinata, Crewe, 195
fraxini, L., 162
frequentella, Stt., 422
frischella, L., 646
froelichiella, Z., 744
fuciformis, L., 295
fugitivella, Z., 597
fulgens, Stt., 723
fuligana, Hb., 464
fuligana, Hw., 455
fuliginaria, L., 147
fuliginosa, L., 39
fulva, Hb., 120
fulvago, Hb., 118
fulvago, L., 61
fulvana, Stph., 498
fulvana, Wilk., 530
fulvata, Forst., 211
fulvescens, Hw., 681
fulviguttella, Z., 689
fulvimitrella, Sodof., 788
fulvipunctana, Hw., 466
fumata, Stph., 244
fumatella, Dgl., 601
Fumea, 773
funebrana, Tr., 517
funerella, F., 631
furcatellus, Zett., 393
furcifera, Hufn., 52
furcula, L., 312
furfurana, Hw., 457
furuncula, Hb., 136
furva, Hb., 132
fusca, Hw., 366
fusca, Hw., 444
fusca, Stt., 767
fuscalis, Schiff., 410
fuscantaria, Hw., 286
fuscedinella, Z., 648
fuscescens, Hw., 637
fuscipunctella, Hw., 791
fuscoaenea, Hw., 686
fuscoaurella, Hw., 637
fuscociliella, Stt., 647
fuscocuprea, Hw., 687
fuscocuprella, HS., 647
fuscodactylus, Hw., 440
fuscoviridella, Hw., 704
fuscula, Bkh., 164
fuscus, Retz., 440

galactodactylus, Hb., 436
galathea, L., 337
galbanella, Z., 602
galiata, Hb., 206
galii, Rott., 297
Galleria, 386
GALLERIADAE, 383
gallicolana, Z., 507
gamma, L., 158
gangabella, Z., 671
ganomella, Tr., 791
Gastropacha, 324
gaunacella, Dup., 759
gei, Wk., 717
gelatella, L., 543
Gelechia, 584
GELECHIADAE, 568
gemina, Hb., 130
geminana, Stph., 477
geminipuncta, Hatch., 111
gemmaria, Brh., 264
gemmata, Hb., 220
gemmella, L., 578
gemmiferana, Tr., 514
geniculeus, Hw., 394
genistae, Bkh., 83
genistae, Stt., 654
genistae, Stt., 609
genistella, Dup., 371
gentianana, Hb., 463
geoffrella, L., 632
Geometra, 249
GEOMETRIDAE, 246
germarana, Hb., 506

germarana, Wilk., 510
gerningana, Schiff., 527
gerronella, Z., 606
geryon, Hb., 449
geyeriana, HS., 550
gibbosella, Z., 605
gigantana, Gn., 558
gigantellus, Schiff., 401
gilvago, Esp., 62
gilvaria, F., 273
glabraria, Hb., 263
glandifera, Hb., 138
glareosa, Esp., 104
glauca, Hb., 82
glaucata, Sc., 315
glaucicolella, Wood, 659
glaucinalis, L., 427
glaucinella, Z., 765
gleichenella, F., 667
globulariae, Hb., 450
Gluphisia, 307
glutinosae, Stt., 721
glyphica, L., 164
Glyphipteryx, 703
gnaphalii, Hb., 47
gnomana, Cl., 527
Gnophria, 29
goedartella, L., 764
Gonepteryx, 351
Goniodoma, 640
gonodactyla, Schiff., 434
Gonodontis, 287
gonostigma, F., 171
gothica, L., 75
gracilalis, Stt., 421
Gracilaria, 749
gracilella, Stt., 590
gracilis, F., 73
graminicolella, Wk., 656
graminis, L., 75
grammica, L., 38
grandaevana, Z., 496
grandipennis, Hw., 686
grandis, Desv., 635
granella, L., 789
granitella, Tr., 771
granulosella, Stt., 626
gratiosella, Stt., 718
Gregsoni, Stt., 669
grevillana, Curt., 464
grisealis, Hb., 148
griseana, Stph., 550
griseana, Wilk., 549
griseata, Schiff., 200
grisella, F., 384
griseocapitella, Stt., 769
griseola, Hb., 28
grossana, Hw., 516
grossulariata, L., 267
grotiana, F., 527
gryphipennella, Bch., 647
Guenei, Dbld., 112
guttea, Hw., 747
Gymnancyla, 364
Gymnoscelis, 183
Gypsonoma, 481
gysseleniella, Dup., 761

Habrosyne, 288
Hadena, 125
Halias, 36
halterata, Hufn., 182
hamana, L., 558
hamellus, Thnb., 389
hammoniella, Sorhagen, 683
hamula, Esp., 317
Harmodia, 76
harpagula, Esp., 317
harpana, Hb., 481
Harpella, 632
harpella, Schiff., 698
hartmanniana, L., 461
hastata, L., 205
hastiana, L. 521
hawkerana, Stt., 504
haworthana, Stph., 704
haworthiata, Stt., 192
Haworthii, Curt., 135
headleyella, Stt., 726
hectus, L., 799
heegerana, Wilk., 511
heegeriella, Z., 738
Heliodines, 675
Heliophobus, 59
Heliothis, 108
Heliozela, 682
hellerella, Dup., 678
Hellmanni, Ev., 121
helveticaria, B., 196
helvetina, B., 96
helvola, Hb., 27
helvola, L., 62
Hemaris, 293
hemerobiella, Sc., 650
hemidactylella, F., 751
Hemimene, 499

heparana, Schiff., 533
heparata, Hw., 223
hepariella, Stt., 767
hepatica, Hb., 132
HEPIALIDAE, 798
Hepialus, 799
hera, L., 42
heracliana, De Geer, 629
herbana, Gn., 467
herbariata, F., 235
herbida, Hb., 108
herbosana, Barr., 503
hermannella, F., 573
Herminia, 148
heroldella, Hb., 769
Hesperia, 356
HESPERIADAE, 355
heterodactylus, Hw., 432
Heterogenea, 450
HETEROGENEIDAE, 450
Heterographis, 374
hexadactyla, L., 442
hexapterata, Schiff., 182
heydeniana, Wlsm.. 551
hieracii, Z., 432
Hierophanta, 310
hippocastanaria, Hb., 271
hippocastanella, Dup., 732
hippophaëlla, Schrk., 600
hippothoe, L., 344
hippothoe, Lew., 346
hirsutella, Hb., 444
hirtarius, Cl., 277
hispidaria, F., 277
hispidus, H.-G., 59
Hodgkinsoni, Gregs., 440
Hodgkinsoni, Stt., 719
hofmanniella, Schleich, 754
hohenwarthiana, Gn., 499
hohenwarthiana, Tr., 499
holdenella, Stt., 668
holmiana, L., 526
holosericata, Dup., 237
Homoeosoma, 376
horridella, Tr., 699
hortella, F., 737
hortuellus, Hb., 391
hostilis, Stph., 371
huebnerella, Don., 610
Huebneri, Hw., 593
humeralis, Z., 584
humerellus, Schiff., 608
humiliata, Hufn., 237
humilis, Z., 670
humuli, L., 801
hyale, L., 350
hyalinalis, Hb., 411
Hybernia, 274
hybridalis, Hb., 410
hybridana, Hb., 542
hybridella, Hb., 553
Hydriomena, 207
HYDRIOMENIDAE, 178
Hydrocampa, 403
hyemana, Hb., 543
Hygrochroa, 283
Hylophila, 35
Hypena, 151
Hypenides, 146
Hypenodes, 150
hyperanthus, L., 339
hyperborea, Zett., 107
Hypercallia, 613
hypericana, Hb., 517
hypericella, Tr., 623
Hypochalcia, 368
hyrciniana, Wilk., 494
Hysterosia, 559

ianthina, Esp., 105
ianthinana, Dup., 510
ibipennella, Z., 652
icarus, Rott., 349
ichneumoniforme, F., 566
icterana, Fröl., 537
ictericana, Hw., 541
ignobilella, Stt., 720
ilicifolia, L., 325
illigerella, Hb., 691
illuminatella, Z., 763
illunaria, Hb., 282
illustraria, Hb., 283
illustris, F., 156
imbutata, Hb., 201
imella, Hb., 784
imitaria, Hb., 242
immaculatella, Dgl., 582
immanata, Hw., 213
immorata, L., 243
immundana, F.R., 493
immundella, Z., 727
immutata, L., 241
impar, Warren, 138
imperialella, Mn., 753
implicitana, Wk., 551

impluviata, Hb., 213
impudens, Hb., 71
impura, Hb., 71
incanaria, Hb., 236
incanata, Hw., 241
incarnana, Hw., 481
incarnatana, Hb., 489
incerta, Hufn., 72
incertana, Tr., 540
incongruella, Stt., 638
inconspicuella, Stt., 775
inconspicuella, Wood, 804
Incurvaria, 779
indigata, Hb., 193
inflatae, Stt., 655
ingratella, Knaggs, 423
innotata, Hufn., 195
innotata, Stt., 195
inopella, Z., 579
inopiana, Hw., 559
inornata, Hw., 238
inornatana, HS., 480
inornatella, Dgl., 606
inquinatellus, Schiff., 391
insecurella, Stt.; 692
insigniata, Hb., 195
insignipennella, Stt., 767
insignitella, Z., 739
instabilella, Dgl., 592
instabilis, Esp., 72
intaminatella, Stt., 576
interjecta, Hb., 106
interjectaria, B., 237
intermediella, Brd., 774
internana, Gn., 511
interpunctella, Hb., 372
interrogationis, L., 159
interruptana, Wilk., 513
intimella, Z., 724
inulae, Wk., 656
io, L., 333
iota, L., 157
iris, L., 335
irradiella, Stt., 738
irregularis, Hufn., 78
irriguana, HS., 467
irriguata, Hb., 194
irrorella, L., 30
irrorellus, Hb., 696
Ischnoscia, 783
isodactyla, Z., 434
isogrammaria, HS., 192
Isotrias, 542
jacobaeae, L., 37
janira, L., 339
jasioneata, Crewe, 190
juliana, Curt., 516
juncicolella, Stt., 650
junctella, Dgl., 595
juniperata, L., 210
juniperellus, L., 608
junoniella, Z., 742

Kaltenbachii, Stt., 804
kilmunella, Stt., 668
kindermanniella, HS., 611
kleemannella, F., 744
knaggsiella, Stt., 593
kollariella, Z., 754
kuehniella, Z., 374

laburnella, Stt., 755
lacertinaria, L., 316
lacertula, Schiff., 316
lactana, F., 481
lactearia, L., 249
lacteella, Schiff., 688
lacteella, Stph., 681
lacunana, Dup., 467
Laelia, 171
laetus, Z., 431
lafauryana, Rag., 531
l-album, L., 69
lambda, F., 51
lambdella, Don., 635
laminella, HS., 687
Lampronia, 780
lancealis, Schiff., 407
lanceolana, Hb., 456
lanestris, L., 321
langiella, Hb., 675
lantanella, Schrk., 740
lapella, Hb., 791
lapidata, Hb., 221
lappella, L., 571
lapponaria, B., 276
lapponica, Wk., 724
laricaria, Dbld., 260
laricella, Hb., 649
lariciana, Z., 476
lariciata, Frr., 191
laripennella, Zett., 657
Lasiocampa, 320
LASIOCAMPIDAE, 319
LASIOCAMPINA, 314
Laspeyresia, 508

lathonia, L., 330
lathyri, Stt., 580
lathyrifoliella, Stt., 755
latifasciana, Hw., 457
latiorana, Stt., 531
latistrius, Hw., 393
latreillella, Curt., 676
lautella, Z., 738
lecheana, L., 532
leguminana, Z., 513
lemnata, L., 402
lentiginosella, Z., 603
lepidana, HS., 538
leplastriana, Curt., 511
leporina, L., 140
Leptomeris, 240
Leucania, 67
leucapennella, Hb., 650
leucatella, L., 580
leucographa, Hb., 107
leucomelanella, Z., 596
leucophaea, View., 85
leucophaearia, Schiff., 275
Leucophasia, 352
Leucophthalmia, 244
Leucoptera, 754
leucostigma, Hb., 134
leuwenhoekella, L., 676
libanotidella, Stt., 627
libatrix, L., 154
lichenaria, Hufn., 262
lichenea, Hb., 53
lienigialis, Z., 428
lienigiana, Z., 439
lienigiella, Z., 662
ligea, L., 340
lignata, Hb., 226
ligniperda, F., 560
ligula, Esp., 65
ligulella, Z., 582
ligustri, F., 142
ligustri, L., 298
limacodes, Hufn., 451
limbarius, F., 266
Limenitis, 335
limitata, Sc., 227
Limnoecia, 674
limoniella, Stt., 640
limosipennella, Dup., 649
linariata, F., 190
linea, F., 358
linearia, Hb., 245
lineata, F., 296
lineata, Sc., 272
lineola, Curt., 421
lineola, O., 358
lineolata, Hb., 207
lineolea, Hw., 655
linneella, Cl., 677
Lipoptycha, 503
lipsiana, Schiff., 523
literana, L., 522
literata, Don., 213
literella, Hw., 764
literosa, Hw., 136
lithargyrea, Esp., 68
Lithocolletis, 733
lithodactyla, Tr., 439
lithorhiza, Bkh., 52
Lithosia, 26
lithoxylea, F., 131
litterata, Sc., 404
littoralis, Curt., 69, 456
littorella, Dgl., 579
litura, L., 63
liturata, Cl., 257
liturella, Hb., 623
liturella, Schiff., 621
livornica, Esp., 296
lixella, Z., 651
l-nigrum, Müll., 170
lobella, Schiff., 617
Lobesia, 455
Lobophora, 181
lobulata, Hb., 180
loeflingiana, L., 537
Loewii, Z., 440
loganella, Stt., 747
logiana, Schiff., 523
longana, Hw., 541
longicornis, Curt., 603
lonicerae, Esp., 448
Loreyi, Dup., 68
lorquiniana, Dup., 525
lota, Cl., 63
lotella, Hb., 363
lotella, Stt., 756
Loxostege, 418
Lozopera, 544
lubricipeda, L., 40
lucella, F., 700
lucernea, L., 97
lucida, Hufn. 165
lucidella, Stph. 576
lucina, L., 342
lucipara, L., 128

luctuosa, Esp., 166
luculella, Hb., 596
lunaria, Schiff., 283
lunaris, Hw., 636
lunaris, Schiff., 161
lundana, F., 478
lunigera, Stph., 91
lunosa, Hw., 58
Luperina, 112
lupulinalis, Gn., 416
lupulinus, L., 800
luridana, Gregs., 549
luridata, Bkh., 260
lurideola, Zk., 27
lutarea, Hw., 769
lutarella, L., 26
luteago, Hb., 78
lutealis, Hb., 408
luteata, Schiff., 223
luteella, Stt., 721
luteolata, L., 258
luticomella, Z., 668
lutipennella, Z., 648
lutosa, Hb., 119
lutulenta, Bkh., 58
lutulentella, Z., 576
luzella, Hb., 781
Lycaena, 347
LYCAENIDAE, 342
lychnitis, Ramb., 49
lyellella, Dbld., 584
Lyonetia, 756
Lythria, 232

maccana, Tr., 523
machaon, L., 355
macilenta, Hb., 63
Macroglossa, 294
macularia, L., 270
maculea, Hw., 593
maculiferella, Dgl., 595
maculosana, Hw., 555
magnificella, Tgst., 667
malella, Stt., 722
malvae, L., 356
malvella, Hb., 602
mancuniata, Knaggs., 237
manniana, F.R., 549
mansuetella, Z., 806
Marasmarcha, 437
marcidella, Curt., 772
margaritalis, Schiff., 424
margaritaria, L., 280
margaritellus, Hb., 393
Margaronia, 405
margarotana, Hein., 471
marginana, Hw., 463
marginaria, Bkh., 275
marginata, F., 119
marginata, L., 268
marginea, Hw., 759
marginellus, F., 608
marginepunctata, Gz., 241
marginepunctata, Stph., 236
marginepunctella, Stph., 777
marginicolella, Stt., 719
maritima, Stt., 731
maritima, Tausch., 124
maritimana, Gn., 547
marmorea, Hw., 380, 596
masculella, Hb., 780
matura, Hufn., 124
maura, L., 129
Mecyna, 417
medea, Hb., 340
mediana, F., 517
medon, Esp., 346
megacephala, F., 142
megaera, L., 337
megerlella, Stt., 671
Melanargia, 337
Melanchra, 79
Melanchrides, 66
melanella, Hw., 776
melanopa, Thnb., 87
Meliana, 66
melilotella, Scott, 646
meliloti, Esp., 448
Meliphora, 383
Melissoblaptes, 384
Melitaea, 330
mellonella, L., 386
mendica, Cl., 40
mendica, Hw., 765
mensuraria, Schiff., 227
menthastri, Esp., 40
menyanthidis, View., 144
mercurella, L., 422
mercurella, Z., 422
mercuriana, Hb., 470
merdella, Z., 791
Mesographe, 425
mesomella, L., 29
messaniella, Z., 743
messingiella, F.R., 703
Metachrostis, 137

metallicana, Hb., 467
metallicus, Pod., 796
metaxella, Hb., 793
meticulosa, L., 127
Metrocampa, 280
metzneriella, Stt., 570
mi, Cl., 163
miaria, Bkh., 232
miata, L., 212
micacea, Esp., 119
micana, Fröl., 467
microdactyla, Hb., 438
microgrammana, Gn., 514
MICROPTERYGIDAE, 801
MICROPTERYGINA, 797
Micropteryx, 802
Microstega, 417
microtheriella, Stt., 720
migadactyla, Hw., 437
Miltochrista, 30
miniata, Forst., 30
minimus, Fuesl., 345
minimellus, Z., 797
miniosa, F., 74
ministrana, L., 536
minorata, Tr., 218
minos, Fuesl., 448
minusculella, HS., 715
minutana, Hb., 484
minutata, Gn., 187
minutella, L., 636
miscella, Schiff., 682
Miselia, 55
misella, Z., 790
mitterbacheriana, Schiff., 480
mixtana, Hb., 523
modestana, HS., 487
modestella, Dup., 661
moeniata, Sc., 228
molybdeola, Gn., 27
Moma, 139
Mompha, 678
monacha, L., 175
monachella, Hb., 785
moneta, F., 156
Monima, 72
MONOCTENIADAE, 250
monodactyla, L., 439
monoglypha, Hufn., 130
Monopis, 783
montanata, Bkh., 230
monticola, Wk., 668
monticolana, Wilk., 470
morosa, Mühl., 576
morosa, Z., 781
morpheus, Hufn., 122
Morrisii, Dale, 121
mouffetella, Schiff., 581
mucronella, Sc., 698
mucronella, Schiff., 401
muehligiella, Stt., 658
mulinella, Z., 603
multistrigaria, Hw., 228
munda, Esp., 74
mundana, L., 31
mundella, Dgl., 589
munitata, Hb., 230
muralis, Forst., 138
murana, Curt., 421
muricata, Hufn., 235
murinata, Sc., 224
murinipennella, Dup., 659
muscalella, F., 780
muscerda, Hufn., 28
musciforme, View., 567
muscosella, Z., 599
musculana, Hb., 532
musculosa, Hb., 120
mussehliana, Tr., 550
myellus, Hb., 392
Myelois, 378
mygindana, Schiff., 466
myllerana, F., 705
myopiforme, Bkh., 566
myricae, Gn., 143
Myrmecozela, 782
myrtillana, Tr., 479
myrtillella, Stt., 723
myrtilli, L., 87
Mysticoptera, 181

Naclia, 23
naevana, Hb., 477
naeviferella, Dup., 574
nana, Hw., 552
nana, Rott., 77
nanana, Tr., 474
nanata, Hb., 196
nanatella, Stt., 622
nanella, Hb., 580
nanivora, Stt., 769
napi, L., 353
Narycia, 776
nebritana, Z., 513
nebulella, Hb., 377
nebulosa, Hufn., 86

neglecta, Hb., 102
neglectana, Dup., 482
Nemeobius, 342
Nemophora, 792
nemoralis, F., 148
nemoralis, Sc., 406
nemorella, L., 699
Nemoria, 247
nemorivaga, Tgst., 495
Nemotois, 796
Nephopteryx, 370
Nepticula, 710
nerii, L., 296
nervosa, Hw., 630
neurica, Dup., 110
Neuronia, 75
neuropterella, Z., 570
neustria, L., 323
ni, Hb., 159
Nicellii, Stt., 744
Nickerlii, Frr., 112
nictitans, Bkh., 135
nigra, Hw., 58, 599
nigrata, Sc., 413
nigrella, Hw., 669
nigrescentella, Logan, 738
nigricana, HS., 494
nigricana, Stph., 513
nigricans, L., 92
nigricans, Stt., 444
nigricella, Stph., 647
nigricomella, Z., 730
nigricostana, Hw., 464
nigricostella, Dgl., 580
nigripunctella, Hw., 790
nigritella, Dgl., 582
nigrocincta, Tr., 54
nigrofasciaria, Gz., 216
nigromaculana. Hw., 486
nimbana, HS., 516
nimbella, Z., 377
niobe, L., 329
nisella, Cl., 493
nitidana, F., 506
nitidella, F., 766
nitidella, Hof., 774
nivea, Hw., 578
niveana, F., 522
niveicostella, Z., 654
niveus, Ol., 400
noctuella, Schiff., 410
Nola, 33
Nomophila, 410
Nonagria, 110
Notarcha, 406
notata, L., 257
notatella, Hb., 597
notha, Hb., 253
Notocelia, 488
Notodonta, 303
NOTODONTIDAE, 300
NOTODONTINA, 176
notulana, Z., 549
nubeculosus, Esp., 57
nubigena, Ld., 448
nubilalis, Hb., 416
nubilana, Hb., 540
Nudaria, 31
nupta, L., 162
nutantella, Mühl., 655
Nyctegretis, 378
nylandriella, Tgst., 716
nymphaeata, L., 403
NYMPHALIDAE, 327
Nymphula, 402

obductella, F.R., 367
obelisca, Hb., 92
obeliscata, Hb., 210
obfuscaria, Hb., 271
obliquaria, Bkh., 200
obliquella, Stt., 671
oblitella, Dbld., 577
oblitella, Z., 374
obliterata, Hufn., 223
oblongana, Hw., 463
oblongata, Thnb., 189
obscura, Brh., 98
obscurana, Stph., 490
obscurana, Wilk., 507
obscuraria, Hb., 270
obscurella, Hein., 589
obscurella, Stt., 670
obscuripunctella, Stt., 685
obsitalis, Hb., 152
obsoleta, Hb., 70
obsoletella, F.R., 591
obtusana, Hw., 483
obtusella, Stt., 660
occulta, L., 96
occultana, Wilk., 474
occultella, Dgl., 670
ocellana, F., 476, 624
ocellaris, Bkh., 62
ocellata, L., 209
ocellatella, Boyd, 593

ocellatus, L., 300
ocelleus, Hw., 396
ochracea, Hb., 110
ochraceana, Stph., 528
ochraceella, Curt., 681
ochraceella, Tgst., 782
ochrata, Sc., 240
ochrea, Hw., 651
ochrearia, Ross., 273
ochreella, Stt., 674
Ochria, 109
ochrodactyla, Hb., 434
ochroleuca, Esp., 134
ochroleucana, Hb., 462
ochromelana, Gn., 464
Ochsenheimeria, 777
ochsenheimeriana, Z., 506
Ocneria, 175
OCNERIADAE, 169
Ocnerostoma, 760
ocnerostomella, Stt., 685
octogesima, Hb., 291
octomaculana, Hw., 541
octomaculata, F., 412
ocularis, Gn., 291
oculatella, Z., 704
oculea, Gn., 135
Odonestis, 323
Odontosia, 309
Oecophora, 633
OECOPHORIDAE, 611
oehlmanniella, Tr., 788
Oeonistis, 25
Oinophila, 733
oleagina, F., 55
oleracea, L., 84
olerella, Z., 627
olivacella, Stt., 649
olivalis, Schiff., 415
olivana, Tr., 467
olivata, Bkh., 231
oliviella, F., 633
omicronaria, Hb., 246
omissella, Stt., 753
ononaria, Fuesl., 252
ononidis, Z., 753
onosmella, Brh., 655
oo, L., 118
opacella, HS., 444
Operophtera, 222
ophiogramma, Esp., 134
Ophiusa, 153
ophthalmicana, Hb., 497
opima, Hb., 73
Opisthograptis, 256
Opostega, 728
oppressana, Tr., 475
or, F., 290
orbicularia, Hb., 244
orbitella, Z., 648
orbona, F., 100
orbona, Hufn., 101
Orgyia, 171
orichalcea, F., 157
orichalcea, Stt., 663
orion, Esp., 139
ornata, Sc., 242
ornatella, Schiff., 365
Orneodes, 442
ORNEODIDAE, 441
ornithopus, Rott., 52
Ornix, 746
orobana, Tr., 512
orobi, Stt., 755
Orthosia, 59
Orthotaelia, 697
osseana, Sc., 542
osseata, F., 237
osseata, Stt., 237
osseella, Stt., 579
osteodactyla, Z., 438
ostrina, Hb., 168
ostrinalis, Hb., 413
Ourapteryx, 279
oxyacanthae, Fr., 740
oxyacanthae, L., 56
oxyacanthella, Dup., 769
oxyacanthella, Stt., 716
Oxyptilus, 431

pabulatricula, Brh., 134
padellus, L., 696
padi, Z., 695
padifoliella, Hb., 757
palaemon, Pall., 357
paleacea, Esp., 118
palealis, Schiff., 419
paleana, Hb., 537
Palimpsestis, 290
pallens, L., 71
pallescentella, Stt., 791
palliatella, Zk., 652
pallida, Stph., 423
pallidana, Z., 553
pallidella, Z., 727
pallifrontana, Z., 512

pallorella, Z., 622
palpella, Hw., 614
palpina, L., 308
Paltodora, 571
paludana, Barr., 478
paludata, Thnb., 201
paludella, Hb., 387
paludicola, Stt., 660
paludicolella, Dbld., 680
paludum, Fr., 672
paludum, Z., 431
palumbaria, Bkh., 227
palumbella, F., 367
palustrana, Z., 466
palustrella, Dgl., 577
palustris, Hb., 121
Pammene, 505
Pamphila, 358
pamphilus, L., 341
Pamplusia, 469
Pancalia, 676
pandalis, Hb., 417
Pandemis, 533
Panemeria, 167
paniscus, F., 357
Panolis, 76
pantaria, L., 268
panzerella, Stph., 637
paphia, L., 329
Papilio, 355
papilionaria, L., 250
PAPILIONIDAE, 354
PAPILIONINA, 325
papyratia, Marsh, 40
par, Hb., 138
parallelaria, Schiff., 282
Pararge, 337
Parasia, 570
parasitella, Hb., 788
parenthesella, Hw., 608
parenthesella, L., 700
pariana, Cl., 706
paripennella, Z., 647
parisiana, Gn., 523
parthenias, L., 253
parva, Hb., 168
parvidactylus, Hw., 432
parvulana, Wilk., 499
pascuana, Hb., 540
pascuellus, L., 390
pasivana, Hb., 540
passulella, Barr., 373
pastinacella, Stt., 630
pastinum, Tr., 153
paula, Hb., 169
paupella, Z., 579
pauperana, Dup., 470
pavonia, L., 313
paykulliana, Wilk., 484
pectinataria, Kn., 232
pectinea, Hw., 780
pedaria, F., 277
pedella, L., 664
pedriolellus, Stt., 394
peliella, Tr., 602
pellionella, L., 791
peltigera, Schiff., 108
Pelurga, 221
Pempelia, 364
pendularia, Cl., 245
penkleriana, F.R., 492
pennaria, L., 285
pentadactylus, L., 436
penziana, Wd., 540
perfumaria, Newm., 264
Perinephela, 407
Perittia, 685
perla, F., 138
perlellus, Sc., 393
perlepidana, Hw., 511
perlepidella, Stt., 772
permixtana, Hb., 455
permutana, Dup., 524
pernotata, Gn., 191
perochraria, F.R., 236
perplexana, Barr., 524
perplexella, Stt., 669
persicariae, L., 86
perspicillaris, L., 125
perterana, Dbld., 541
petasitis, Dbld., 119
petiverella, L., 501
petraria, Hb., 271
petrificata, F., 51
pfeifferella, Hb., 684
pflugiana, Hw., 495
phaeodactyla, Hb., 438
phaeoleuca, Stt., 422
Phalera, 312
Phalonia, 545
PHALONIADAE, 543
phasianipennella, Hb., 752
Phaulernis, 690
phegea, L., 23
philanthiformis, Lasp., 567
Philedone, 526

Philereme, 202
phlaeas, L., 346
Phlyctaenia, 408
Phoberia, 161
Phragmatobia, 39
Phragmatoecia, 445
phragmitella, Stt., 675
phragmitellus, Hb., 397
phragmitidis, Hb., 120
phryganella, Hb., 616
Phycita, 370
PHYCITIDAE, 361
Phyllocnistis, 757
Phylloporia, 783
picana, Fröl., 461
picarella, Cl., 789
picata, Hb., 212
piceana, L., 529
piceana, Wilk., 498
pictalis, Curt., 428
pictaria, Curt., 270
pictella, Z., 574
PIERIDAE, 349
Pieris, 352
pigra, Hufn., 302
pilella, F., 793
pilleriana, Schiff., 528
pilosaria, Hb., 277
pilosellae, Esp., 448
pilosellae, Z., 432
pimpinellae, Z., 629
pimpinellata, Gn., 191
pimpinellata, Hb., 188
pinastri, L., 298
pinastri, L., 129
pinellus, L., 393
pinetaria, Hb., 258
pinetellus, L., 393
pinguedinella, Dbld., 375
pinguinalis, L., 428
pinguinella, Tr., 600
pinguis, Hw., 375
piniariella, Z., 760
piniarius, L., 265
pinicolana, Dbld., 470
pinicolana, Z., 474
pinicolella, Dup., 661
piniperda, Panz., 76
pinivorana, Z., 471
pisana, Gn., 513
pisi, L., 85
pistacina, F., 63
plagiata, L., 200
plagicolella, Stt., 720
plagiodactylus, Stt., 441
plantaginella, Stt., 591
plantaginis, L., 41
Platyedra, 605
Platyptilia, 432
Platytes, 395
plecta, L., 95
Plemyria, 204
Pleurota, 614
plexippus, L., 328
Plodia, 371
plumaria, Hb., 263
plumbagana, Tr., 503
plumbana, Sc., 504
plumbaria, F., 227
plumbellus, Schiff., 696
plumbeolata, Hw., 191
plumigera, Esp., 308
Plusia, 155
PLUSIADAE, 144
Plusiades, 153
Plutella, 701
PLUTELLIDAE, 692
poae, Stt., 669
podalirius, L., 355
podana, Sc., 530
Polia, 49
Poliades, 46
politana, Gn., 501
politana, Hw., 538
politella, Stt., 590
pollinariella, Stt., 673
polychloros, L., 333
polycommata, Hb., 181
polydactyla, Hb., 442
polygonalis, Hb., 418
polygrammata, Bkh., 221
polyodon, Cl., 125
polyodon, L., 130
Polyploca, 291
POLYPLOCIDAE, 288
pomella, Vaughan, 714
pomifoliella, Z., 740
pomonella, L., 515
populana, F., 508
popularis, F., 76
populata, L., 204
populella, Cl., 604
populeti, Tr., 73
populetorum, Z., 752
populi, L., 299, 321
porata, F., 245

porcellus, L., 295
porphyrea, Esp., 132
porphyrea, Hb., 95
porrectella, L., 701
Porthesia, 174
portlandicella, Rich., 589
postremana, Z., 465
potatoria, L., 323
potentillae, Stt., 647
potentillana, Cooke, 28
poterii, Stt., 718
praeangusta, Hw., 661
praecocella, Z., 763
praecox, L., 93
praelatella, Schiff., 781
praelongana, Gn., 462
prasina, F., 108
prasinana, L., 36
prasinaria, Hb., 280
pratana, Hb., 542
prataria, B., 243
pratellus, L., 391
Prays, 694
proboscidalis, L., 151
procellata, F., 220
Procris, 449
prodromana, Hb., 527
prodromaria, Schiff., 278
profugella, Stt., 689
profundana, F., 465
progemmaria, Hb., 275
promissa, Esp., 162
promutata, Gn., 241
pronuba, L., 100
pronubella, Schiff., 770
propinquella, Stt., 680
propinquella, Tr., 622
propugnata, F., 229
prosapiaria, L., 280
protea, Bkh., 53
proteana, HS., 524
proximana, Dbld., 494
proximana, Wilk., 513
proximella, Hb., 597
pruinata, Hufn., 250
prunalis, Schiff., 409
prunaria, L., 281
prunata, L., 203
prunetorum, Stt., 719
pruni, L., 343
pruniana, Hb., 463
prunifoliella, Hb., 757
pryerella, Vaughan, 379
Psammotis, 411
Psecadia, 630
Pselnophorus, 437
pseudobombycella, Hb., 776
Pseudopanthera, 269
pseudospretella, Stt., 637
Pseudoterpna, 250
psi, L., 141
psittacata, Schiff., 212
Psodos, 274
Psoricoptera, 604
Psyche, 444
PSYCHIDAE, 443
PSYCHINA, 442
pterodactyla, Hb., 439
pterodactyla, L., 440
PTEROPHORIDAE, 429
Pterophorus, 435
Pterostoma, 308
Ptilophora, 308
Ptocheuusa, 578
pubicornis, Hw., 781
pudibunda, L., 173
pudorina, Hb., 71
pulchella, Hw., 670
pulchella, L., 37
pulchellata, Stph., 190
pulcherrimella, Stt., 629
pulchraria, Ev., 223
pulchrina, Hw., 158
pulla, Esp., 773
pullata, Stt., 270
pullella, HS., 669
pulveralis, Hb., 411
pulveraria, L., 281
pulveratella, HS., 576
pulverosella, Stt., 726
pulverulenta, Esp., 74
pumilata, Hb., 183
punctalis, Schiff., 405
punctaria, L., 245
punctata, F., 269
puncticostana, Wilk., 506
punctidactyla, Hw., 433
punctularia, Hb., 260
puniceali, Schiff., 414
pupillana, Cl., 486
purpuralis, L., 413
purpurana, Hw., 466
purpuraria, L., 232
purpurascentella, Stt., 766
purpurea, Hw., 625
purpurella, Hw., 803

pusaria, L., 279
pusiella, Röm., 632
pusillata, F., 193
pustulata, Hufn., 248
puta, Hb., 94
putrescens, Hb., 70
putris, L., 98
Pygaera, 302
pygmaeana, Hb., 472
pygmaeana, Hw., 772
pygmaeana, Wilk., 485
pygmaeata, Hb., 192
pygmaeella, Hb., 764
pygmaeella, Hw., 714
pygmaeola, Dbld., 26
Pylarge, 244
pyralella, Hb., 423
pyraliata, F., 211
Pyralididae, 425
PYRALIDINA, 360
pyralina, View., 116
Pyralis, 426
pyramidea, L., 114
pyrastrana, Hb., 530
Pyrausta, 411
pyrausta, Pall., 631
Pyraustidae, 397
pyrella, Vill., 770
pyri, Glitz., 716
pyrina, L., 446
pyrophila, F., 98
pyrrhulipennella, Z., 653

quadra, L., 25
quadrana, Hb., 474
quadrifasciaria, Cl., 230
quadrimaculella, Boh., 728
quadripuncta, Hw., 611
quadripunctata, F., 122
quadripunctella, Stph., 781
quadruplella, Z., 752
quaestionana, Z., 501
quaestionella, HS., 576
quercana, F., 613
quercana, Schiff., 36
quercifolia, L., 324
quercifoliella, Z., 743
quercinaria, Hufn., 286
quercus, L., 320, 344
quinqueguttella, Stt., 742
quinquella, Bed., 725

radiatella, Don., 700
radiella, Curt., 773
ramana, Fröl., 481
ramburialis, Dup., 404
ramella, L., 484
rapae, L., 353
raschkiella, Z., 680
ratzeburgiana, Rtz., 475
ravida, Hb., 98
ravulana, HS., 490
reclusa, F., 302
rectangulata, L., 182
rectilinea, Esp., 129
Recurvaria, 606
redimitana, Gn., 506
regiana, Z., 508
regiella, HS., 716
reliquana, Wilk., 455
reliquella, Z., 729
remutaria, Hb., 241
repandalis, Schiff., 415
repandata, L., 263
resinea, Hw., 420
resinella, L., 471
resplendella, Stt., 683
reticella, Newm., 772
reticulata, F., 203
reticulata, Vill., 81
retiferana, Wk., 471
retinella, Z., 765
retusa, L., 118
revayana, Tr., 35
Rhacodia, 519
rhamnata, Schiff., 202
rhamni, L., 351
rhamniella, Z., 678
rhediella, Cl., 506
rhizolitha, F., 52
rhodochrella, HS., 623
rhododactyla, F., 435
Rhodometra, 232
rhombella, Schiff., 601
rhomboidaria, Hb., 264
rhomboidea, Tr., 103
rhynchosporella, Stt., 672
ribeana, Hb., 533
ribesiaria, B., 203
ridens, F., 292
ripae, Hb., 94
rivata, Hb., 206
Rivula, 169
rivulana, Sc., 466
roborana, Hb., 530
roborana, Tr., 489

roboraria, Schiff., 259
roborella, Zk., 370
roboricolella, Brd., 774
roboris, Schrk., 320
roboris, Z., 737
Roeselia, 32
roesella, L., 676
Roeslerstammia, 770
rorellus, L., 392
rosaecolana, Dbld., 488
rosana, L., 531
roseana, Hw., 551
roseticolana, Z., 510
rostralis, L., 151
rotundaria, Hw., 279
rotundella, Dgl,, 626
Roxburghii, Gregs., 373
ruberata, Frr., 213
rubi, L., 322, 343
rubi, View., 102
rubidata, F., 216
rubiella, Bjerk., 781
rubiginata, F., 205
rubiginata, Hufn., 243
rubiginea, F., 65
rubiginosana, HS., 473
rubivora, Wk., 722
rubricata, F., 243
rubricollis, L., 29
rubricosa, F., 107
rubrotibiella, F.R., 382
rufa, Hw., 112
rufana, Sc., 465
rufana, Schiff., 522
rufata, F., 200
rufescens, Hw., 606
ruficapitella, Hw., 714
ruficiliana, Hw., 551
ruficinctata, Gn., 215
rufillana, Wilk., 510
rufimitrana, HS., 474
rufimitrella, Sc., 794
rufina, L., 62
rufocinerea, Hw., 673
rufuncula, Hw., 136
rugosana, Hb., 555
rumicis, L., 143
rumina, L., 355
rupicapraria, Hb., 273
rupicola, Curt., 550
ruralis, Sc., 406
rurea, F., 131
ruricolella, Stt., 789
Rusina, 113
russata, Bkh., 213
russula, L., 41
rusticana, Tr., 538
rusticata, F., 235
rusticella, Hb., 785
rutilana, Hb., 547

sacraria, L., 232
sagittata, F., 211
salaciella, Tr., 729
Salebria, 365
salicalis, Schiff., 152
salicata, Hb., 231
salicella, Hb., 615
salicella, L., 460
salicicolella, Sirc., 740
salicis, Curt., 144
salicis, L., 175
salicis, Stt., 723
salicolella, Brd., 774
salicorniae, Hering, 592
salicorniae, Wk., 650
saligna, Z., 757
salinella, Stt., 658
salinellus, Tutt, 395
salopiella, Stt., 803
sambucalis, Schiff., 410
sambucaria, L., 279
sangiella, Stt., 582
Sangii, Wood, 804
sanguinalis, L., 413
saponariae, Bkh., 81
Sarrothripus, 34
satellitia, L., 64
satura, Hb., 132
saturatella, Stt., 653
saturnana, Gn., 504
Saturnia, 313
SATURNIADAE, 313
satyrata, Hb., 189
SATYRIDAE, 336
Satyrus, 338
saucia, Hb., 93
sauciana, Hb., 464
saxicola, Vaughan, 377
saxifragae, Stt., 768
scabiosata, Bkh., 197
scabiosella, Dgl., 745
scabiosellus, Sc., 796
scabrana, Stph., 523
scabrella, L., 699
scabriuscula, L., 129

scalella, Sc., 584
Scardia, 778
schalleriana, L., 524
schiffermillerella, Schiff., 797
schmidiella, Fr., 663
schmidiellus, Heyd., 609
schoenicolella, Stt., 705
Schoenobius, 400
schrankella, Hb., 680
Schrankia, 149
schreberella, F., 745
Schreckensteinia, 690
schreibersiana, Fröl., 556
schulziana, F., 466
schwarziella, Z., 793
Sciapteron, 567
scintilulana, Hb., 705
scirpi, Stt., 672
scitella, Z., 756
Scoliaula, 727
scoliiforme, Bkh., 564
Scoliopteryx, 154
scolopacina, Esp., 132
Scoparia, 419
scopariana, HS., 513
scopariella, Hein., 621
scopariella, Z., 743
scopoliana, Hw., 499
scopoliana, Wilk., 499
scotana, Wilk., 522
scotica, White, 423
scoticella, Stt., 747
scotinella, HS., 600
scriptana, Hb., 461
scriptella, Hb., 597
scrophulariae, Cap., 48
scutosa, Schiff., 109
scutulana, Wilk., 495
scutulata, Bkh., 239
scutulatella, Stt., 747
Scythris, 685
Scythropia, 779
segetum, Schiff., 91
selasellus, Hb., 395
selene, Schiff., 330
Selenia, 282
Selidosema, 262
SELIDOSEMIDAE, 254
sellana, Hb., 463
semele, L., 338
semialbana, Gn., 532
semiargus, Rott., 345
semibrunnea, Hw., 51
semicostellus, Hb., 608
semidecandrella, Stt., 595
semifascia, Hw., 751
semifasciana, Hw., 461
semifulvella, Hw., 792
semifusca, Hw., 765
semifuscana, Stph., 498
Semioscopis, 616
semipurpurella, Stph., 804
semirubella, Sc., 366
semirufa, Hw., 373
semitestacella, Curt., 767
senecionis, Vaughan, 377
senectana, Gn., 503
senectella, Z., 589
senescens, Stt., 686
senex, Hb., 31
Senta, 124
sepiaria, Hufn., 266
sepium, Spr., 774
seppella, F., 806
septembrella, Stt., 724
sequana, Hb., 501
sequax, Hw., 599
sequella, Cl., 701
serena, F., 81
serella, Stt., 718
sericea, Gregs., 27
sericealis, Sc., 169
sericiella, Hw., 683
sericopeza, Z., 725
serotinus, Z., 441
serricornis, Stt., 671
servillana, Dup., 510
Setina, 30
sexalisata, Hb., 181
shepherdana, Stph., 525
sibilla, L., 335
siccella, Z., 687
siccifolia, Stt., 647
sicula, Hb., 317
siculana, Hb., 479
signatana, Dgl., 484
signatella, HS., 610
silaceata, Hb., 214
silago, Hb., 61
silvellus, Hb., 390
Simaethis, 706
similana, Hb., 495
similana, Wilk., 463
similella, Hb., 636
similis, Fuesl., 174
similis, Stt., 589

simplana, F.R., 473
simplicella, HS., 792
simpliciana, Hw., 502
simulans, Hufn., 98
simulata, Hb., 210
sinapis, L., 352
sinuana, Stph., 539
sinuata, *Hb.*, 217
sinuella, F., 376
sircomella, *Stt.*, 581
siterata, Hufn., 212
Sitotroga, 571
smaragdaria, F., 249
smeathmanniana, F., 548
Smerinthus, 299
sobrina, Gn., 106
sobrinata, Hb., 196
socia, Rott., 51
sociata, Bkh., 206
sociella, L., 385
sodalella, Z., 382
sodaliana, *Wilk.*, 555
solandriana, L., 497
solaris, *Esp.*, 165
Solenobia, 774
solidaginis, Hb., 51
solitariella, Z., 649
solutella, Z., 601
somnulentella, Z., 758
sorbi, Fr., 741
sorbi, Stt., 721
sorbiana, Hb., 531
sorbiella, Tr., 764
sordida, Bkh., 133
sordidana, Hb., 498
sordidata, F., 212
sororcula, Hufn., 28
sororculana, Zett., 462
sororculella, Hb., 600
spadicea, *Hw.*, 65
spadicearia, Bkh., 229
sparganella, Thnb., 697
sparganii, Esp., 111
Sparganothis, 528
sparmannella, Bosc., 803
sparsaria, Hb., 199
sparsiciliella, *Barr.*, 582
spartiata, Fuesl., 199
spartiella, Schrk., 609
spartifoliella, Hb., 755
spatulella, HS., 729
Sphaeroeca, 490
spheciforme, Gern., 565
SPHINGIDAE, 292
Sphinx, 297
sphinx, Hufn., 57
spilodactylus, Curt., 437
spiniana, Dup., 508
spinicolella, Stt., 741
spiniella, *Hb.*, 769
spiniella, Z., 766
spinolella, Dup., 739
spinula, *Schiff.*, 315
spissicella, F., 370
splendana, Hb., 515
splendidella, HS., 369
splendidissimella, HS., 717
splendidulana, Gn., 506
Spodoptera, 113
sponsa, L., 162
sponsana, F., 522
squamatella, *Stt.*, 727
squamosella, Stt., 657
stabilana, *Stph.*, 498
stabilella, Fr., 669
stabilis, View., 73
stachydalis, Zk., 416
stagnata, Don., 402
Staintoni, *Sirc.*, 682
staintoniana, *Barr.*, 464
stanneella, F.R., 683
Stathmopoda, 663
statices, L., 449
Stauropus, 307
steinkellneriana, Schiff., 617
stellatarum, L., 294
Stenia, 404
Stenolechia, 577
Stenoptilia, 440
Stephensi, Stt., 682
Stephensia, 674
Sterrha, 240
STERRHIDAE, 233
Sterrhopterix, 444
stettinensis, Nic., 744
sticticalis, L., 418
stigmatella, F., 751
stigmatica, Hb., 103
Stilbia, 124
Stilpnotia, 174
stipella, *Dbld.*, 636
stipella, Hb., 574
stramentalis, *Hb.*, 424
straminalis, Hb., 424
straminata, Tr., 236
straminea, Hw., 557

straminea, Tr., 71
stramineella, Stt., 752
stramineola, Dbld., 28
stratarius, Hufn., 278
stratiotata, L., 403
strelitziella, HS., 601
striana, Schiff., 469
striata, L., 38
striatella, Hb., 572
strigaria, Hb., 243
strigata, Müll., 247
strigilaria, Hb., 243
strigilis, Cl., 137
strigillaria, Hb., 272
strigosa, F., 141
strigula, Schiff., 34
strigula, Thnb., 95
strobilella, L., 485
suaedella, Rich., 592
suasa, Bkh., 84
suavella, Zk., 380
subalbidella, Schl., 674
subammanella, Stt., 783
subaquilea, Stt., 636
subarcuana, Wilk., 480
subbaumanniana, Wilk., 554
subbimaculella, Hw., 725
subbistrigella, Hw., 681
subciliata, Gn., 193
subdecurtella, Stt., 574
subfulvata, Hw., 189
subjectana, Gn., 540
sublustris, Esp., 131
subnigrella, Dgl., 669
subnotata, Hb., 197
subobscurella, Dbld., 670
subocellana, Don., 492
subocellea, Stph., 579, 673
subochreella, Dbld., 637, 674
subornatella, Dup., 364
subpropinquella, Stt., 623
subpurpurella, Hw., 805
subrosea, Stph., 97
subroseana, Hw., 550
subroseana, Wilk., 551
subsequa, Hb., 101
subsequana, Hw., 485
subsericeata, Hw., 237
subtilella, Fuchs, 783
subtristata, Hw., 206
subtusa, F., 118
subumbrata, Gn., 197
succedana, Fröl., 514
succenturiata, L., 190
suffumata, Hb., 214
suffusa, Hb., 91
suffusana, Z., 489
suffusella, Dgl., 577
suffusella, Z. 758
sulphuralis, L., 167
sulphurella, F., 633
sulphurellum, Hw., 749
sulzella, Schiff., 795
suspecta, Hb., 64
Swammerdamia, 768
swammerdammella, L., 793
swederella, Thnb., 751
sylvanus, Esp., 359
sylvata, Hb., 223
sylvata, Sc., 268
sylvaticella, Wood, 659
sylvella, Hw., 737
sylvella, L., 700
sylvestrana, Curt., 471
sylvestrella, Rag., 369
sylvinus, L., 800
Symmoca, 610
Synaphe, 429
Synopsia, 266
Syntomididae, 23
Syntomis, 23
syringaria, L., 284
syringella, F., 752

tabaniforme, Rott., 567
tabulella, Brd., 774
Tachyptilia, 604
taeniadactyla, South, 434
taeniata, Stph., 218
taeniatella, Stt., 670
taeniolella, Z., 581
tages, L., 357
Taleporia, 775
taminata, Hb., 270
tanaceti, Stt., 503
tapetiella, L., 785
taraxaci, Hb., 123
tarquiniella, Stt., 574
tarsipennalis, Tr., 147
tedella, Cl., 494
Teichobia, 777
temerata, Hb., 269
temerella, Z., 604
templi, Thnb., 55
tenebrata, Sc., 167
tenebrella, Hb., 575

tenebrosa, Hb., 113
tenebrosella, Z., 575
tenella, Z., 738
tenerana, Dup., 475
Tengstroemi, Nolck., 718
tengstromella, Dbld., 657
tenuiata, Hb., 192
tenuicornis, Stt., 781
tephradactyla, Hb., 439
Tephroclystis, 184
Tephronia, 266
terebrella, Zk., 376
terminella, Westw., 679
terrealis, Tr., 409
terrella, Hb., 590
tersata, Hb., 198
tesserana, Tr., 548
testacea, Hb., 112
testaceata, Don., 223
testata, L., 204
testudo, Schiff., 451
tetradactylus, L., 436
tetragonana, Stph., 489
tetragonella, Stt., 577
tetralunaria, Hufn., 283
tetraquetrana, Hw., 494
teucrii, Greening, 432
thalassina, Rott., 84
thaumas, Hufn., 358
Thecla, 342
Theria, 273
therinella, Tgst., 656
thoracella, Thnb., 732
thrasonella, Sc., 704
thunbergella, F., 806
Thyatira, 289
thymiaria, Gn., 247
tiliae, Fr., 715
tiliae, L., 300
tiliaria, Bkh., 286
tincta, Brh., 85
tinctella, Hb., 637
tinctoriella, Coverdale, 653
Tinea, 786
TINEIDAE, 707
TINEINA, 560
Tineola, 782
tiphon, Rott., 341
tipuliforme, Cl., 565
Tischeria, 758
tithonus, L., 339
tityrella, Stt., 721
Tmetocera, 476
togata, Hb., 198
torminalis, Wood, 716
torminella, Fr., 741
torquatella, Z., 694
torquillella, Z., 747
tortricella, Hb., 543
TORTRICIDAE, 518
TORTRICINA, 451
Tortrix, 534
torva, Hb., 305
trabealis, Sc., 167
tragopogonis, L., 114
transitana, Gn., 538
trapeziella, Stt., 666
trapezina, L., 117
trauniana, Schiff., 508
treitschkiella, F.R., 684
tremula, Cl., 305
trepida, Esp., 306
trepidaria, Tr., 274
treveriana, Hb., 522
triangulum, Hufn., 100
triatomea, Hw., 673
Trichophaga, 785
Trichopteryx, 180
Trichoptilus, 430
tricolorella, Hw., 594
tridens, Schiff., 141
trifasciata, Bkh., 213
trifasciella, Hw., 745
trifolii, Esp., 320, 448
trifolii, Rott., 82
Trifurcula, 727
trigeminana, Stph., 495
trigeminata, Hw., 239
trigonodactylus, Stt., 434
trigrammica, Hufn., 123
triguttella, Stt., 741
trilinea, Bkh., 123
trilinearia, Bkh., 245
trimacula, Esp., 306
trimaculana, Don., 483
trimaculana, Hw., 489
trimaculella, Hw., 725
tringipennella, Z., 752
triparella, Z., 598
tripartita, Hufn., 159
Triphaena, 105
triplasia, L., 160
tripoliana, Barr., 487
tripoliella, Hodgk., 656
tripuncta, Hw., 636
tripunctana, F., 492

tripunctaria, HS., 188
triquetrella, Dbld., 775
triseriatella, Stt., 673
trisignaria, HS., 192
trisignella, Z., 636
tristana, Hb., 523
tristata, L., 205
tristellus, F., 395
tristrigella, Hw., 745
tritici, L., 96
tritophus, Esp., 304
Trochilium, 563
troglodytella, Dup., 656
truncata, Hufn., 213
truncicolella, Stt., 422
TRYPANIDAE, 559
Trypanus, 559
tumidana, Schiff., 382
tumidella, Zk., 382
turbidana, Tr., 496
turca, L., 68
turfosalis, Wk., 149
turionana, Hb., 471
typhae, Esp., 111
typica, L., 104
Tyria, 37

udana, Gn., 549
uddmanniana, L., 488
ulicana, Gn., 504
ulicetana, Hw., 514
ulicicolella, Stt., 743
uliginosalis, Stph., 414
uliginosana, Westw., 525
uliginosellus, Z., 390
ulmana, Hb., 556
ulmata, F., 268
ulmella, Knaggs, 423
ulmella, Z., 732
ulmifoliella, Hb., 739
ulmivora, Hein., 718
ultimaria, B., 191
ultimella, Stt., 628
ulvae, Hb., 124
umbellana, Stph., 621
umbra, Hufn., 119
umbrana, Hb., 521
umbratica, L., 48
umbrosa, Hb., 102
umbrosella, Z., 588
unangulata, Hw., 217
unanimis, Tr., 135
uncana, Hb., 480
uncana, L., 166
uncula, Cl., 166
undulana, Hb., 35
undulata, L., 201
unguicella, L., 479
unguicula, Hb., 318
unidentaria, Hw., 229
unifasciana, Dup., 532
unifasciata, Hw., 218
unimaculella, Zett., 804
unionalis, Hb., 405
unipuncta, Hw., 70
unitella, Hb., 637
upupana, Tr., 481
Uraba, 33
urticae, Esp., 40
urticae, Hb., 159
urticae, L., 333
urticana, Hb., 467
urticata, L., 407
ustomaculana, Curt., 485
ustulana, Hw., 464
ustulellus, F., 609
Utetheisa, 37

vaccinella, Hb., 625
vacciniana, Z., 474
vacciniella, Stt., 742
vaccinii, L., 66
vacculella, F.R., 778
Valeria, 55
valerianata, Hb., 188
valesina, Esp., 329
valligera, Hb., 90
Vanessa, 332
variata, Schiff., 210
variegana, Hb., 462
variegana, Schiff., 523
variella, Stph., 687
v-aureum, Gn., 158
vectisana, Westw., 549
velleda, Hb., 800
velocella, Dup., 602
venosa, Bkh., 144
venosata, F., 186
Venusia, 225
venustula, Hb., 165
verbascalis, Schiff., 416
verbascellus, Hb., 608
verbasci, L., 49
verellus, Zk., 392
verhuellella, Stt., 777
vernana, Knaggs, 507

vernaria, Hb., 249
versicolora, L., 319
verticalis, L., 418
verticalis, Schiff., 406
verticillata, Gn., 158
vespertaria, Stph., 282
vespiforme, Westw., 567
vestigialis, Rott., 90
vetulata, Schiff., 202
vetusta, Hb., 50
vetustella, Stt., 732
v-flavum, Hw., 733
vibicella, Hb., 652
vibicigerella, Z., 653
vibrana, Hb., 706
viburniana, F., 537
vicinella, Dgl., 596
viduaria, Bkh., 264
vigintipunctatus, Retz., 696
vilella, Z., 605
villica, L., 42
villosella, O., 444
viminalis, F., 52
viminetella, Z., 648
vimineticola, Fr., 723
viminetorum, Stt., 740
viminiella, Stt., 743
vinculella, HS., 792
vinolentella, HS., 678
vinula, L., 311
viretata, Hb., 180
virgata, Rott., 207
virgaureae, L., 344
virgaureae, Stt., 657
virgaureana, Tr., 539
virgaureata, Dbld., 191
virgularia, Hb., 236
viridana, L., 537
viridaria, Cl., 166
viridaria, F., 232
viridata, L., 248
viridella, Sc., 795
viscariella, Stt., 594
viscerella, Stt., 715
vitalbata, Hb., 198
vitellina, Hb., 69
vitisella, Gregs, 648
vittata, Bkh., 226
vittella, L., 701
v-nigrum, F., 170
vorticella, Sc., 582
vulgata, Hw., 188
vulgella, Hb., 598
vulnerariae, Z., 653

wailesella, Stt., 755
w-album, Kn., 343
walkerana, Curt., 527
warringtonellus, Stt., 393
wauaria, L., 259
wavaria, F., 259
Weaveri, Stt., 725
weirana, Dgl., 506
weirella, Stt., 629
Wilkinsoni, Scott, 648
wimmerana, Wilk., 486
w-latinum, Bkh., 83
wockeella, Z., 650
Wockii, Hein., 775
woeberiana, Schiff., 476
woodiana, Barr., 460
woodiella, Curt., 635
woolhopiella, Stt., 721

xanthographa, F., 101
xanthomista, Hb., 54
Xanthorhoe, 225
xanthotricha, Stgr., 373
Xenolechia, 583
xerampelina, Hb., 60
xylosteana, L., 530
xylostella, Hb., 702
xylostella, L., 698

yeatiana, F., 624
Yponomeuta, 695
ypsilon, Bkh., 64
ypsilon, Rott., 91
Ypsolophus, 607

Zelleri, Knaggs, 423
Zelleri, Rag., 382
Zelleria, 767
zephyrana, Tr., 547
zephyrella, Hb., 626
Zetterstedtii, Z., 434
Zeuzera, 446
ZEUZERIDAE, 445
ziczac, L., 304
Zinckenii, Tr., 51
zoegana, L., 558
zonariella, Tgst., 671
zonaria, Schiff., 276
zophodactyla, Dup., 440
Zygaena, 446
ZYGAENIDAE, 446

Printed by R. & R. Clark, Limited, *Edinburgh.*

BOOKS FOR

STUDENTS OF NATURAL HISTORY.

THE CAMBRIDGE NATURAL HISTORY. Edited by S. F. Harmer, M.A., Fellow of King's College, Cambridge, Superintendent of the University Museum of Zoology; and A. E. Shipley, M.A., Fellow of Christ's College, Cambridge, University Lecturer on the Morphology of Invertebrates. Vol. III. Molluscs and Brachiopods. By the Rev. A. H. Cooke, M.A., Fellow and Tutor of King's College, Cambridge; A. E. Shipley, M.A., Fellow of Christ's College, Cambridge; and F. R. C. Reed, M.A., Trinity College, Cambridge. Illustrated. Medium 8vo. 17s. net.

NATURAL HISTORY AND ANTIQUITIES OF SELBORNE. By Gilbert White. With Notes by Frank Buckland, a Chapter on Antiquities by Lord Selborne, and new Letters illustrated by P. H. Delamotte. New and Cheaper Edition. Crown 8vo. 6s.

FORTY YEARS IN A MOORLAND PARISH. Reminiscences and Researches in Danby-in-Cleveland. By Rev. J. C. Atkinson, D.C.L., Canon of York and Incumbent of the Parish, Author of "A History of Cleveland," "A Glossary of the Cleveland Dialect." With Maps and Illustrations. Extra Crown 8vo. 8s. 6d. net. Illustrated Edition. 12s. net.

A HANDBOOK OF BRITISH LEPIDOPTERA. By Edward Meyrick, Assistant Master at Marlborough. Illustrated. Extra Crown 8vo.

AN INTRODUCTION TO THE STUDY OF SEA WEEDS. By George Murray, F.L.S., Keeper of Botany in the Natural History Department of the British Museum. Illustrated. Crown 8vo. [*Immediately.*

HANDBOOK OF FIELD AND GENERAL ORNITHOLOGY. A Manual of the Structure and Classification of Birds. With Instructions for Collecting and Preserving Specimens. By Elliott Coues. Profusely Illustrated. 8vo. 10s. net.

STRUCTURE AND LIFE OF BIRDS. By F. W. Headley, Assistant Master in Haileybury College. Illustrated. 8vo. 7s. 6d.

TALES OF THE BIRDS. By W. Warde Fowler, M.A. With Illustrations by Bryan Hook. Second Edition. Crown 8vo. 3s. 6d.

A YEAR WITH THE BIRDS. By W. Warde Fowler, M.A. With Illustrations by Bryan Hook. Third Edition, enlarged. Crown 8vo. 3s. 6d.

SUMMER STUDIES OF BIRDS AND BOOKS. By W. Warde Fowler, M.A. Crown 8vo. 6s.

THE NATURAL HISTORY OF AQUATIC INSECTS. By L. C. Miall, F.R.S., Professor of Biology in the Yorkshire College, Leeds. Illustrated. Crown 8vo. 6s.

ROMANCE OF THE INSECT WORLD. By L. N. Badenoch. With Illustrations by Margaret J. D. Badenoch and others. Crown 8vo. 6s.

MACMILLAN AND CO., LONDON.

BOOKS FOR STUDENTS OF NATURAL HISTORY.

THE DEPTHS OF THE SEA. An Account of the General Results of the Dredging Cruises of H.M.SS. *Porcupine* and *Lightning* during the Summers of 1868, 1869, and 1870, under the Scientific Direction of Dr. CARPENTER, F.R.S.; J. GWYN JEFFREYS, F.R.S.; and Dr. WYVILLE THOMSON, F.R.S. By Sir C. WYVILLE THOMSON, F.R.S. With numerous Illustrations and Maps. Second Edition. Medium 8vo. 31s. 6d.

THE VOYAGE OF THE *CHALLENGER*. THE ATLANTIC. A Preliminary Account of the General Results of the Exploring Voyage of H.M.S. *Challenger* during the Year 1873 and the Early Part of the Year 1876. With Portrait, Plates, and Maps. In two Vols. Published by Authority of the Lords Commissioner of the Admiralty. Medium 8vo. 45s.

OBSERVATIONS ON THE GEOLOGY AND ZOOLOGY OF ABYSSINIA, made during the Progress of the British Expedition to that Country in 1867-1868. By W. T. BLANFORD, F.R.S. With Illustrations and Geological Map. 8vo. 21s.

WORKS BY A. R. WALLACE, F.R.S.

DARWINISM: An Exposition of the Theory of Natural Selection, with Some of its Applications. With Maps and Illustrations. Extra Crown 8vo. 9s.

NATURAL SELECTION AND TROPICAL NATURE. Essays on Descriptive and Theoretical Biology. Extra Crown 8vo. 6s.

THE MALAY ARCHIPELAGO: The Land of the Orang Utan and the Bird of Paradise. A Narrative of Travel. With Studies of Man and Nature. With Maps and Illustrations. Fourth Edition. Extra Crown 8vo. 6s.

ISLAND LIFE: or the Phenomena and Causes of Insular Faunas and Floras. Including a Revision and Attempted Solution of the Problem of Geological Climates. With Illustrations and Maps. Second Edition. Extra Crown 8vo. 6s.

THE GEOGRAPHICAL DISTRIBUTION OF ANIMALS; with a Study of the Relations of Living and Extinct Faunas as Elucidating the Past Changes of the Earth's Surface. With Maps and Illustrations. In Two Vols. Medium 8vo. 42s.

AN INTRODUCTION TO THE OSTEOLOGY OF THE MAMMALIA: being the substance of the course of lectures delivered at the Royal College of Surgeons of England in 1870. By Sir W. H. FLOWER, F.R.S., F.R.C.S., Director of the Natural History Museum. Illustrated. Third Edition. Revised with the assistance of HANS GADOW, Ph.D. Crown 8vo. 10s. 6d.

WILD BEASTS AND THEIR WAYS. Reminiscences of Europe, Asia, Africa, and America, from 1845-1888. By Sir SAMUEL W. BAKER, Pacha, F.R.S. With Illustrations. New and Cheaper Edition. Extra Crown 8vo. 12s. 6d.

WANDERINGS IN SOUTH AMERICA, THE NORTH-EAST OF THE UNITED STATES, AND THE ANTILLES, IN THE YEARS 1812, 1816, 1820, and 1824. With Original Instructions for the perfect Preservation of Birds, etc., for Cabinets of Natural History. By CHARLES WATERTON, Esq. Edited by the Rev. J. G. WOOD. With 100 Illustrations. Crown 8vo. 6s.

FROM A NEW ENGLAND HILLSIDE. Notes from Underledge. By WILLIAM POTTS. Pot 8vo. 3s.

THE FRIENDSHIP OF NATURE. A New England Chronicle of Birds and Flowers. By MABEL OSGOOD WRIGHT. 16mo. 3s.

MACMILLAN AND CO., LONDON.

WORKS ON

BIOLOGY AND ZOOLOGY.

MATERIALS FOR THE STUDY OF VARIATION. Treated with especial regard to Discontinuity in the Origin of Species. By WILLIAM BATESON, M.A., Fellow of St. John's College, Cambridge. 8vo. 21s. net.

AMPHIOXUS AND THE ANCESTRY OF THE VERTEBRATES. By ARTHUR WILLEY, B.Sc., Tutor in Biology, Columbia College; Balfour Student of the University of Cambridge. With a preface by HENRY FAIRFIELD OSBORN. 8vo. 10s. 6d. net.

THE MYOLOGY OF THE RAVEN (*Corvus corax Sinuatus*). A Guide to the Study of the Muscular System in Birds. By R. W. SHUFELDT, of the Smithsonian Institute, Washington, U.S.A. With Illustrations. 8vo. 13s. net.

ORGANIC EVOLUTION AS THE RESULT OF THE INHERITANCE OF ACQUIRED CHARACTERS ACCORDING TO THE LAWS OF ORGANIC GROWTH. By Dr. G. H. THEODOR EIMER, Professor of Zoology and Comparative Anatomy in Tübingen. Translated by J. T. CUNNINGHAM, M.A., F.R.S.E., late Fellow of University College, Oxford. 8vo. 12s. 6d.

FROM THE GREEKS TO DARWIN. An Outline of the Development of the Evolution Idea. By HENRY FAIRFIELD OSBORN, Sc.D., Da Costa Professor of Biology in Columbia College, Curator in the American Museum of Natural History. 8vo. 9s. net.

LESSONS IN ELEMENTARY BIOLOGY. By T. JEFFREY PARKER, B.Sc., F.R.S., Professor of Biology in the University of Otago, New Zealand. Illustrated. Second Edition. Crown 8vo. 10s. 6d.

KEY TO NORTH AMERICAN BIRDS. Containing a concise account of every species of living and fossil bird at present known from the continent north of the Mexican and United States boundary, inclusive of Greenland. Second Edition, with which are incorporated General Ornithology—an outline of the structure and classification of birds, and Field Ornithology—a manual of collecting, preparing and preserving birds. By ELLIOTT COUES, M.A., M.D., Ph.D., Member of the National Academy of Sciences. Profusely illustrated. Super Royal 8vo. 42s.

MONOGRAPH OF THE BRITISH CICADÆ OR TETTIGIIDÆ (Froghoppers and Grassflies). By GEORGE BOWDLER BUCKTON, F.R.S., Corr. Memb. Acad. Nat. Hist. of Philadelphia, Memb. de la Soc. Ent. de France. Illustrated by more than 400 Coloured Drawings. Two Vols. Demy 8vo. 33s. 6d. each net. Also in Eight Parts. 8s. each net.

THE FOSSIL INSECTS OF NORTH AMERICA. With Notes on some European Species. By SAMUEL H. SCUDDER. Vol. I. The Pretertiary Insects. With 34 Plates. Vol. II. The Tertiary Insects. With a Map and 28 Plates. 4to. Paper Boards. 90s. net.

MACMILLAN AND CO., LONDON.

WORKS ON BIOLOGY AND ZOOLOGY.

A TEXT-BOOK OF COMPARATIVE ANATOMY. By Dr. ARNOLD LANG, Professor of Zoology in the University of Zurich, formerly Ritter Professor of Phylogeny in the University of Jena. With Preface to the English Translation by Professor Dr. ERNST HAECKEL. Translated into English by HENRY M. BERNARD, M.A., Cantab., and MATILDA BERNARD. Part I. 8vo. 17s. net. [Vol. II. *in the Press.*

AN ATLAS OF PRACTICAL ELEMENTARY BIOLOGY. By G. B. HOWES, Assistant Professor of Zoology. With a preface by Professor HUXLEY, F.R.S. Med. 4to. 14s.

A TEXT-BOOK OF ZOOLOGY. By T. J. PARKER, F.R.S., Professor of Biology in the University of Otago, New Zealand, and W. A. HASWELL, Professor of Biology in the University of Sydney. 8vo. [*In the Press*

THE BOTANICAL TEXT-BOOK (Sixth Edition). Part I. STRUCTURAL BOTANY: or Organography on the Basis of Morphology. To which is added the Principles of Taxonomy and Phytography, and a Glossary of Botanical Terms. By ASA GRAY, LL.D., Fisher Professor of Natural History (Botany) in Harvard University. 8vo. 10s. 6d.

A COURSE OF PRACTICAL INSTRUCTION IN BOTANY. By F. O. BOWER, D.Sc., F.L.S., Regius Professor of Botany in the University of Glasgow. Crown 8vo. 10s. 6d.

THE STUDENT'S FLORA OF THE BRITISH ISLANDS. By Sir J. D. HOOKER, K.C.S.I., C.B., M.D., D.C.L. Oxon, LL.D. Cantab. Third Edition. Globe 8vo. 10s. 6d.

THE FERTILISATION OF FLOWERS. By Prof. HERMANN MÜLLER. Translated and edited by D'ARCY W. THOMPSON, B.A. With a Preface by CHARLES DARWIN. With Illustrations. Medium 8vo. 21s.

SOME VOLUMES OF THE

NATURE SERIES.

Crown 8vo.

CHARLES DARWIN. Memorial Notices reprinted from *Nature.* By THOMAS H. HUXLEY, F.R.S.; G. J. ROMANES, F.R.S.; Sir ARCHIBALD GEIKIE, F.R.S.; and W. T. DYER, F.R.S. 2s. 6d.

THE SCIENTIFIC EVIDENCES OF ORGANIC EVOLUTION. By GEORGE J. ROMANES, F.R.S. 2s. 6d.

ARE THE EFFECTS OF USE AND DISUSE INHERITED? An Examination of the View held by Spencer and Darwin. By W. PLATT BALL. 3s. 6d.

EXPERIMENTAL EVOLUTION. By H. D. VARIGNY. 5s.

TIMBER AND SOME OF ITS DISEASES. By Prof. H. M. WARD, F.R.S. Illustrated. 6s.

ON THE COLOURS OF FLOWERS. By GRANT ALLEN. Illustrated. 3s. 6d.

FLOWERS, FRUITS, AND LEAVES. By Sir JOHN LUBBOCK, M.P., F.R.S. Illustrated. 4s. 6d.

ON BRITISH WILD FLOWERS, CONSIDERED IN RELATION TO INSECTS. By Sir JOHN LUBBOCK, M.P., F.R.S. Illustrated. 4s. 6d.

THE ORIGIN AND METAMORPHOSES OF INSECTS. By Sir JOHN LUBBOCK, M.P., F.R.S. With Illustrations. 3s. 6d.

THE APODIDÆ. A MORPHOLOGICAL STUDY. By HENRY MEYNERS BERNARD, M.A., Cantab. With 71 Illustrations. 7s. 6d.

MACMILLAN AND CO., LONDON.

THIS BOOK IS DUE ON THE LAST DATE
STAMPED BELOW

RENEWED BOOKS ARE SUBJECT TO IMMEDIATE
RECALL

LIBRARY, UNIVERSITY OF CALIFORNIA, DAVIS

Book Slip–50*m*-8,'69 (N831s8) 458–A-31/5

Nº 683915

Meyrick, E.
A handbook of
British Lepidoptera.

QL555
G7
M48

LIBRARY
UNIVERSITY OF CALIFORNIA
DAVIS